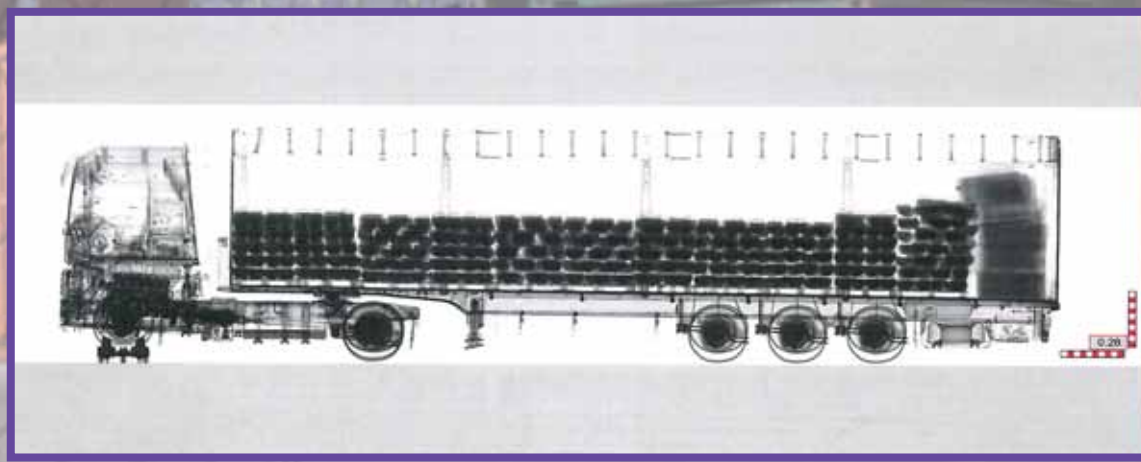
UNEP

Risk Assessment of Illegal Trade in HCFCs



United Nations Environment Programme

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PREFACE

The Montreal Protocol on Substances that Deplete the Ozone layer has been regarded as "perhaps the most successful international agreement to date."[1] Since entering into force in 1989 the treaty has demonstrated how developed and developing countries can unite to address a global environmental threat.

Illegal trade in ozone depleting substances (ODS) arose as an unintended consequence of the phase-out of these materials and as illegal trade in ODS soared in the mid-1990s the Montreal Protocol, somewhat belatedly, responded through the creation of national import/export licensing systems. Today global awareness of the threat posed by illegal trade in ODS has never been higher, with numerous enforcement efforts aimed at curbing the black market trade.

Introduced as replacements to chlorofluorocarbons (CFCs), hydrochlorofluorocarbons (HCFCs) were the global refrigerant of choice, dominating many international markets. In response to rampant growth in HCFC use in 2007 the Parties to the Montreal Protocol agreed to accelerate their phase-out.

Implementing the accelerated phase-out of HCFCs is a tremendous challenge; curbing and abating run-away production and consumption growth in developing countries combined with some ongoing resistance to ODS-free alternatives in developed countries. Cases of illegal trade in HCFCs have already been detected in both developed and developing countries. It is imperative that lessons learnt from past ODS phase-outs are applied to HCFCs as the Montreal Protocol cannot afford to be undermined by illegal trade.

There is a genuine concern that as the phase-out of HCFCs begins to take hold in developing countries there will be a sharp spike in black market trade which would threaten compliance with the Montreal Protocol. In order to help Parties meet this challenge the present report provides an assessment of the current and future risk of illegal trade in HCFCs with particular focus on developing countries. The document takes a holistic approach analysing numerous factors contributing to black market trade, as well as historical information and recent case studies. It analyses the risk and scale of future HCFC smuggling and proposes targeted recommendations to mitigate these risks.

Section 1: **CONTEXT**

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 harmful solar ultraviolet radiation (UV).[2] In 1985 scientists detected severe thinning of the ozone layer in Antarctica. Since then this hole in the ozone layer has been recorded every year, generally growing bigger and lasting longer. It is predicted that Arctic ozone losses will persist into the 2050-2070 period, with recovery taking several more decades.[3]

Severe depletion of the ozone layer is due to human activity introducing artificially high quantities of chlorine and/or bromine containing ODS into the stratosphere, where these chemicals destroy ozone molecules. Widely used chemical compounds are to blame – especially CFCs and HCFCs widely used as refrigerants, and halons used as fire suppressants.

Increased exposure to UV radiation directly impacts human health. Effects include suppression of the immune system, photo-aging of the skin, cataracts and skin cancer. Every year there are between two and three million new cases of non-melanoma skin cancers globally, with an estimated 66,000 annual deaths from various types of skin cancer.[4]

In 1987, global concern over the threat posed by ozone depleting substances led to the establishment of the Montreal Protocol on Substances that Deplete the Ozone Layer. Since then it has achieved universal ratification of 196 Parties – the first international treaty to achieve this. The Protocol establishes legally binding controls on national production and consumption of ODS with complete phase out as the final goal, allowing the ozone layer to recover.

By 2010 the phase-out of CFCs was largely completed on schedule in developing countries while developed countries had already eliminated most of CFCs by 1996. However black market trade in CFCs lingers. During the gradual move away from CFCs, HCFCs (grouped under Annex C of the Protocol) were widely adopted as transition chemicals, especially for refrigeration and air-conditioning (RAC) and foams.

Concerns over the burgeoning use of these chemicals prompted Parties to the Montreal Protocol in 2007 to accelerate the initial phase-out schedule for HCFCs. Although HCFCs have a relatively low ozone-depleting potential (ODP) (such as 0.055 for HCFC-22 and 0.11 for HCFC-141b) compared to CFCs (CFC-11 and CFC-12 both have ODPs of 1), the substances have a high global warming potential (GWP) (1,430 for HCFC-22 and 725 for HCFC-141b). The advanced phase-out of HCFCs promises benefits not just for the ozone layer but also, potentially, for the climate system. Yet the rapid rise in the production and use of HCFCs presents a stern challenge to the Montreal Protocol in ensuring that the accelerated phase-out targets are met.

Section 2: **ILLEGAL TRADE IN CFCs**

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ABOVE:
CFC cylinders, China, 2005.

Under the Montreal Protocol CFCs were the first group of chemicals (termed Annex A) to undergo phase out. Initial controls focused on industrialised countries (i.e. countries operating under Article 2 of the Protocol, also referred to as "non-Article 5" countries). For example, production of CFCs in the European Union (EU) ceased in 1995 and a year later in the United States of America (US), except for essential uses such as for metered dose inhalers (asthma inhalers) and export to meet the basic domestic needs of developing countries (i.e. countries operating under Article 5 of the Protocol or "Article 5" countries). Controls were also implemented on imports of CFCs, except for recycled or reclaimed CFCs not covered under the Montreal Protocol phase out schedule, and for repacking for onward export to Article 5 countries.

Yet these controls were easily circumvented and by the mid-1990s a thriving illegal trade in CFCs had emerged. Lack of awareness amongst enforcement agencies and initially the absence of effective checks such as licensing systems contributed to growth in smuggling. Initial cases were detected in the United States (US) around 1994, especially in Florida, where smugglers attempted to avoid high import taxes designed to reduce demand for CFCs. Fewer cases were detected in the European Union (EU), but in 1997 an illegal trade network run by a German company was exposed after smuggling 630 metric tonnes (MT) of CFCs into the EU.

Smuggling methods rapidly evolved to exploit loopholes in the regulatory systems, such as falsely declaring virgin CFCs as recycled or reclaimed, and diverting material purportedly imported for repackaging onto the domestic market. The bulk of the illicit CFCs entering the US and EU markets came from Central and South-East Asia. By the late 1990s it was estimated that up to 38,000 MT of CFCs were being traded illegally every year, equivalent to 20% of global CFC trade.[5]

By the turn of the century the scale of the black market for CFCs in the US and EU had declined. In 1997 the Montreal Amendment had introduced mandatory establishment of licensing systems for import and export of all ODS, also contained in mixtures. The authorities in certain countries responded to illegal trade with new regulations, such as the EU sales ban, and improved enforcement, such as the US inter-agency task force and its *Operation Cool Breeze*. Donor

funding to accelerate the shut down of CFC production was also a contributory factor. However, in later years this may have contributed to significant demand for CFCs in some former producing countries which has led to ongoing illegal trade in the respective regions.

Originally a problem only in Article 2 countries, illegal CFC trade cases began appearing in Article 5 countries soon after the commencement of a consumption freeze in 1999. Over the next five years illicit CFCs were seized in a host of Article 5 countries, including India, Thailand, Indonesia, the Philippines, and Kuwait, as well as transition economies such as Georgia.[6] By 2005 it was estimated that up to 14,000 MT of illicit CFCs were being smuggled into Article 5 countries every year with an approximate value of between USD $25 million – 60 million a year.[7]

Article 5 countries responded to the threat through the widespread establishment and enforcement of licensing and quota systems. Subsequently, enforcement capabilities were improved (principally carried out under UNEP's Compliance Assistance Programme). Efforts focused on customs training and manuals, creation of networks to allow information sharing, and the provision of refrigerant identifiers. Additional funding to accelerate the closure of CFC production lines in the main producers - ensured a gradual fall in the scale of illicit CFC trade.

By 1 January 2010 - the date when Article 5 countries were obliged to complete the CFC phase-out - the level of seizures had fallen, although market intelligence suggests a residual black market trade in CFCs, and the need for vigilance by enforcement agencies remains. Production and importation of CFCs for exempted uses has not been banned, so in the absence of strict monitoring of the final destination of those chemicals can be diverted from the restricted uses.

CFC smuggling remains a problem within some Central Asian countries. Between 2007-2009 illegal imports of more than 1,100 MT of allegedly recycled CFCs with a retail value of millions of dollars were imported by one country in the region. Cross border co-operation revealed these imports to be fraudulent with virgin CFCs being falsely labelled as recycled.

The experience of CFC smuggling offers important insights for global efforts to control trade in other environmentally harmful commodities. Initially the Montreal Protocol did not take into account the possibility of illegal trade, enabling the problem to become entrenched before reacting with a licensing scheme in 1997 and efforts to financially support Article 5 countries to stop producing CFCs. Yet at the regional level programmes to encourage both cross-border and inter-agency networking, coupled with awareness raising and enforcement training, ultimately proved to be effective responses to the threat of illegal CFC trade.

Illegal trade in CFCs emerged due to the ability of black marketers and fraudsters to exploit the existing market conditions. While increasingly strict controls were progressively introduced in developed countries, latent demand for CFCs to service existing equipment remained high. At the same time production in developing countries grew rapidly, creating large quantities of CFCs at market prices significantly below that of alternatives being promoted in developed countries. The large price differentials opened the door for huge profits to be made by smugglers. Similar market conditions currently exist for HCFCs.

Governments and the enforcement community should carefully consider the lessons learned under the first CFC phase of the Montreal Protocol, and apply the established approaches, networks and information sharing mechanisms to the new HCFC challenge.

BELOW:
Cylinders specialised designed to conceal illegal CFCs.

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SMUGGLING METHODS IDENTIFIED FOR CFCs THAT ARE BEING USED FOR HCFC ILLEGAL TRADE

False Labelling:
CFCs are smuggled in cylinders or packaging labelled as legal products. Initially cases emerged of CFCs being packaged as HCFC-22 (at a time when HCFCs were not subject to controls). As licensing systems came into force and all ODS were flagged by customs, smugglers switched to concealing CFCs in cylinders labelled as HFC-134a, a non ozone-depleting alternative. In some instances this contraband was actually sold as HFCs due to the higher market prices compared with CFCs. Today HCFCs are similarly falsely labelled as HFCs.

Mis-declaration:
CFCs are disguised by putting the names (or/and customs codes and other specific designations) of other similar, legal chemicals on shipping documents and invoices. This method is often combined with "double-layering"; filling a shipping container with CFCs except for a layer of the legitimate chemical stated on the Bill of Lading next to the container door. Cursory inspection will fail to uncover the CFCs at the back of the container. Similar cases of HCFCs being mis-declared as HFCs show this is still a popular technique.

Fake recycled or reclaimed material:
Trade in recycled or reclaimed ODS is less regulated than for virgin CFCs. Smugglers claim the material is recycled or reclaimed on shipping documents and permits, when in fact it is virgin chemicals. The suppliers may even deliberately add a small amount of contaminant to the virgin chemical to make it appear the material has been used, should it be tested. It is likely that smugglers will attempt to import back market HCFCs using this ruse again. According to the Ozone Secretariat there are currently no Article 5 countries with HCFC reclamation facilities therefore any offer selling reclaimed HCFCs from Article 5 countries should be treated with suspicion.

Concealment:
CFCs are simply hidden in ships, cars, or trucks and moved across borders. This method usually involves small quantities, but is lucrative and the overall volume can be significant.

Transhipment fraud:
Consignments of CFCs ostensibly destined for legitimate end markets are diverted onto black markets. This type of fraud often involves complex shipping routes, passing through transit ports and free-trade zones where customs procedures may be more relaxed. Recent HCFC seizures in the US suggest that transhipment fraud is still an ongoing problem.

Double layering:
Smugglers can use tricks such as 'double layering', by hiding the illegal material behind a layer of legal product. This was a frequently used scam where CFCs were hidden behind one or more layers of HCFCs. Today smugglers often hide HCFCs behind a layer of other chemicals such as HFC. The smugglers can make the job of customs even more difficult by tightly wrapping the cylinders, or packing the container without using pallets, making physical checking more difficult.

Section 3: **HCFC MARKET CONDITIONS**

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ABOVE:
HCFC air-conditioning units, China.

HCFCs were introduced as transition alternatives to CFCs being phased out under the Montreal Protocol. As they still have ozone-depleting properties, albeit much less than those of CFCs, it was envisaged that HCFCs would be used as a temporary stepping stone in the transition to the use of ozone-friendly alternatives. However they were widely embraced by both developed and developing countries and are today considered the refrigerant of choice by many users. During the gradual phase-out of CFCs, HCFC consumption in both Article 2 and Article 5 countries grew rapidly.

HCFCs are used in many sectors, most commonly RAC (refrigeration and air-conditioning) and foam blowing, however they are also used in fire protection and solvent applications as well as aerosol propellant gases. In addition to having ODPs between 0.02-0.11,[8] HCFCs are also potent greenhouse gases with GWPs between 77-2310 times that of carbon dioxide.[9]

TABLE 1
ODPs and GWPs of common controlled HCFCs (ODPs and GWPs)

Source: Intergovernmental Panel on Climate Change (2007) 4th Assessment Report

Substance	ODP	GWP (based on 100 year time horizon)
HCFC-22	0.055	1,810
HCFC-123	0.02	77
HCFC-124	0.022	609
HCFC-141b	0.11	725
HCFC-142b	0.065	2,310

HCFCs have become extremely popular alternatives to CFCs and they are now entrenched in markets although ozone- and climate-friendly alternative are available in many countries and for most applications. Since 2000 HCFC use in developing countries has dramatically increased, with consumption growing at a steady rate of around 10 % per year.[10] In 2009 annual global HCFC consumption was 41,781 ODP tonnes per year, equating to about 641,331 MT annually.[11] As HCFCs are also potent greenhouse gases their rapidly increasing use also has detrimental impacts on efforts to address global warming with annual HCFC consumption equivalent to

approximately 957 million tonnes of carbon dioxide equivalent.[12]

Following global concern about both the ozone and climate impacts of mounting HCFC use, in 2007 Parties to the Montreal Protocol agreed to accelerate the phase-out of HCFCs. Under this agreement Article 2 countries must phase out production and use by 2020 with reduction steps of 75% by 2010, 90% by 2015, and total phase out by 2020 with 0.5% of baseline restricted to servicing of refrigeration & air-conditioning equipment until 2030. Article 5 countries have 10 years longer to achieve phase out, with a baseline set as the average of 2009 and 2010 levels of HCFC consumption and production. They must freeze production and use in 2013 with reductions of 10 % in 2015, 35% in 2020, 67.5 % in 2025 and and total phase out by 2030 (with 2.5 % of baseline averaged over 10 years (2030-2040) allowed, if necessary, for servicing of refrigeration & air-conditioning equipment until 2040).

PRODUCTION

Over the last decade production of HCFCs in Article 5 countries has grown rapidly, especially in China and India. Production of HCFCs in Article 5 countries overtook that of non-Article 5 countries for the first time in 2004. China is responsible for most of this growth; in 1997 it produced 1,500 ODP tonnes of HCFCs, and by 2009 this had risen to 28,500 ODP tonnes.[13] Between 2002-2007 annual production and consumption of HCFCs in China increased by an average rate of 28% and 26% respectively.[14]

HCFC Blends:

There is an increasing trend for refrigerant manufacturers to blend different chemicals to get specific refrigerants suitable for various uses. UNEP's online HCFC Help Centre lists 27 HCFC based blends.[15] The increasing diversity of HCFC blends can make their detection by customs difficult. When stopping a suspicious shipment customs may need to take a sample of the consignment for analysis in order to verify whether it contains HCFCs. Usually ODS identification machines are used to assist however increasing numbers of blends makes it difficult to accurately identify these since many refrigerant identifiers are not equipped to accurately identify each blend.

FIGURE 1
HCFC consumption (ODP tonnes) for all Article 5 Parties
Source: Ozone Secretariat

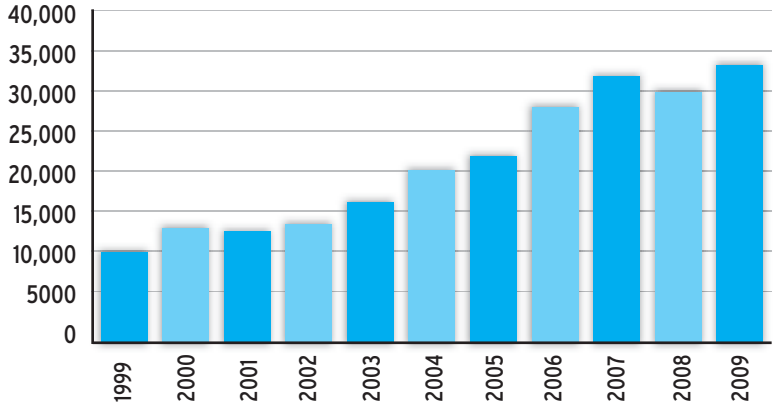


FIGURE 2
Accelerated phase out schedule for production and consumption of HCFC (Montreal Amendment of 2007)

Article 5 (developing) countries	
Schedule	**Year**
Baseline	Average of 2009 and 2010
Freeze	2013
10% reduction (90% of baseline)	2015
35% reduction (65% of baseline)	2020
67.5%(reduction (32.5% of baseline)	2025
Total phase-out	2030
2.5 % of baseline averaged over 10 years (2030-2040) allowed, if necessary, for servicing of refrigeration & air-conditioning equipment until 2040	2030 - 2040

Non-Article 5 (developed) countries	
Schedule	**Year**
Baseline	1989 HCFC consumption + 2.8% of 1989 consumption
Freeze	1996
35% reduction (65% of baseline)	2004
75% reduction(25% of baseline)	2010
90% reduction(10% of baseline)	2015
Total phase-out	2020
0.5% of baseline restricted to servicing of refrigeration & air-conditioning equipment until 2030	2020 - 2030

FIGURE 3
HCFC Production for all Article 5 Parties (ODP tonnes)
Source: Ozone Secretariat

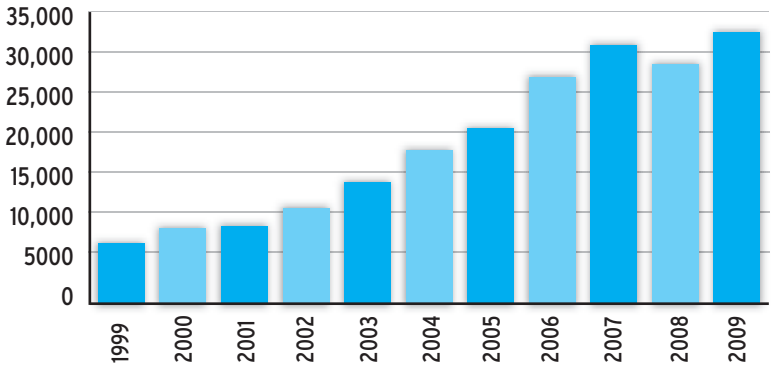


FIGURE 4
India HCFC Production (ODP tonnes)
Source: Ozone Secretariat

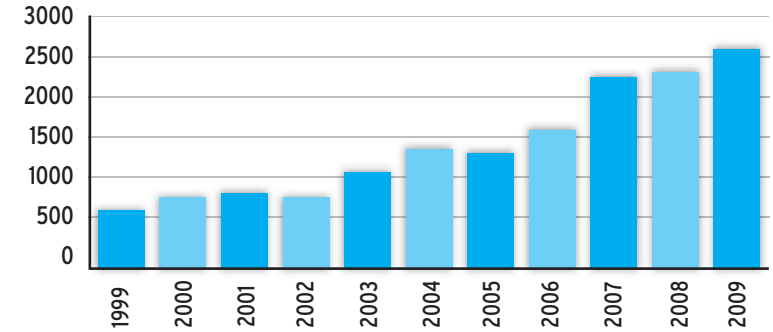
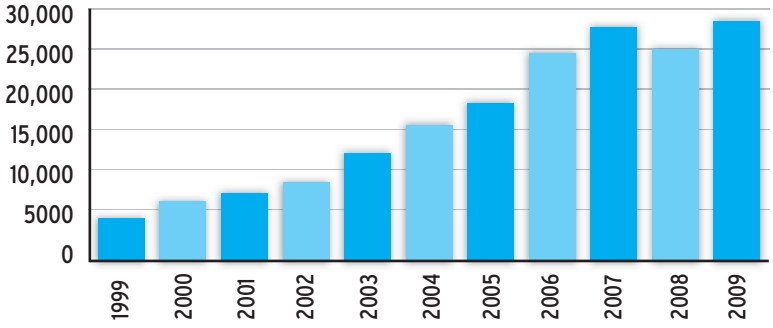


FIGURE 5
China HCFC production (ODP tonnes)
Source: Ozone Secretariat



DEMAND

China is by far the world's largest producer of HCFCs. Analysing the flow of HCFCs traded from China helps to give a clearer picture of the current global HCFC market. Figure 6 shows a map of China's key HCFC trade partners.[16] It illustrates China's average annual reported HCFC exports to countries between 2008-2009. Despite upcoming import restrictions in the US it was China's second largest trading partner.

Article 5 countries:

Under Montreal Protocol definitions consumption is measured as a Party's total production and imports minus exports. Over the past decade demand for HCFCs has steadily increased. Prior to the accelerated HCFC phase-out agreement, predicted growth in HCFC consumption in Article 5 countries between 2005 and 2015 was somewhere between 5-10% per annum.[17] Actual reported data between 2000 and 2008 shows HCFC consumption in developing countries to have grown at a steady annual pace of 15%.[18] A slight drop off of consumption occurred in 2008 thought to be due to the global economic downturn.

Industry research shows that the overwhelming demand for HCFCs in Article 5 countries is for the RAC sector, accounting for 88% of usage, followed by the foam sector at 10%. Within the RAC sector, 67% of HCFCs are for refrigeration, and 21% for air-conditioning.[19] Demand for non-emissive uses such as feedstock use, not controlled by the Montreal Protocol, is also significant and in 2010 was expected overtake demand for emissive uses.[20]

The actual use of HCFCs in different industrial sectors varies greatly from country to country. For instance a 2005 survey of selected Article 5 countries found that the proportion of HCFCs used for RAC servicing varied from 77% in Iran to 20% in India, with Brazil, Indonesia and Argentina using around 50% of all HCFCs consumed in this sector. In terms of lower-volume consuming countries, the main use of HCFCs is for RAC servicing; for instance in Lebanon 69% of 336 MT consumed in 2005 was for RAC servicing while almost all of Sri Lanka's consumption of 225 MT of HCFCs in 2005 was for the RAC sector.[21]

As already indicated earlier in this section, China is now the world's biggest HCFC producer, consumer and exporter. Domestic consumption has been largely powered by the expansion of household air-conditioning equipment manufacture. By 2006 China was producing over 65 million of these units a year, most of which were reliant on HCFCs.[22]

China exports around 30% of its HCFC production. In 2008 it exported 163,300 MT, with HCFC-22 exports of 113,000 MT, followed by 40,000 MT of HCFC-141b.[23]

According to data from China's Ministry of Environmental Protection the main export markets for Chinese HCFCs in South-East Asia and the Middle East are Thailand, Indonesia, Malaysia, the Philippines, and the two major shipping hubs of Singapore and the United Arab Emirates. Much of the demand in countries like Indonesia and Thailand is for HCFC-22 in air-conditioning systems, due to large-scale property development in urban centres, especially office complexes, apartments, large hotels and shopping malls.

Article 2 countries:

Following the recast of Regulation (EC) No 1005/2009 on substances that deplete the ozone layer, as of January 2010 demand for HCFCs within the EU must be met by using either reclaimed of recycled HCFCs. However demand for HCFCs for RAC servicing remains resilient.

There are concerns that such demand could undermine the ban on importation and use of virgin HCFCs which came into force at the beginning of 2010. In the lead up to the ban demand did not drop as much as anticipated, with average HCFC sales between 2006-2008 amounting to 64 % of 1989 baseline levels. In 2008 Europe's HCFC-22 exports amounted to 18,862 MT.[24] Industry sources suggest there is an especially high installed bank of HCFC-based RAC in southern Europe.[25] By 2010 it was estimated that the gap between stock and needs for HCFC-22 in the EU stood at 15,000 tonnes, with reclaimed material likely to provide only 15 % of the deficit. Data from the United Kingdom (UK) suggests that current reclamation levels will meet just 10% of demand for HCFC-22, with significant amounts of existing stocks already ear-marked by large companies.[26]

With the cost of HCFC-22 in the EU ranging from €18-30 per kilogramme, and the chemical available from developing countries available around €2 per kg (not including shipping costs),[27] the incentive for smugglers to step in to meet the demand is clear.

In the UK there is some concern that industry is not fully prepared for the virgin HCFC ban. A 2007 survey found that 70% of 350 retail firms surveyed had at least one refrigeration or air-conditioning system running on HCFC-22.[28] In 2008 one major supermarket chain still had 25% of its refrigeration systems running on HCFC-22.[29] Industry data showed

FIGURE 6

China's average annual reported HCFC exports to its top eight trading partners in 2008-2009

Source: UNCOMTRADE

2009 sales of virgin HCFCs had not fallen as anticipated and sales of reclaimed HCFC had not risen as much as expected suggesting a lack of readiness.[30]

The US has a different HCFC control schedule compared to the EU. US Environmental Protection Agency (EPA) regulations issued under Sections 601-607 of the Clean Air Act phase out the production and import of ODS consistent with schedules developed under the Montreal Protocol. From 2010 the production and import of HCFC-22 and HCFC-142b has been banned, unless it is for use in existing equipment. Imports are controlled through a consumption allowance quota system. Recycled material is exempt, subject to petitioning the EPA for permission to import the material. Additionally refrigerant can be reclaimed within the US using EPA approved reclaimers. Two recent major cases involving large quantities of illegal HCFCs in the US suggest that demand remains and is being partially met by the black market.[31]

Given the booming production of and demand for HCFCs in developing countries, combined with on-going demand and limited supply due to legal restrictions in Article 2 countries, the market conditions appear to be in place for a possible HCFC repeat of the wide scale smuggling seen during the previous CFC phase-out.

Section 4: EMERGING ILLEGAL TRADE IN HCFCs

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ABOVE:
Illegal consignment of HCFCs and CFCs seized in India.

Although strict restrictions on trade in HCFCs have only come into effect in non-Article 5 countries over the last few years, and Article 5 countries are not required to freeze consumption and production of HCFCs until 2013, illegal trade in HCFCs is already a reality.

Due to its nature, illegal trade in any commodity is difficult to accurately quantify, and this applies to HCFCs, especially as circumvention of controls by methods such as mis-declaration inevitably leads to data reporting gaps. One indication of illegal trade is the incidence of seizures, although this can also be a function of enforcement efforts, so that the countries with the highest level of seizures are not necessarily those with the biggest black market. Other indicators of illegal trade in ODS include availability of controlled chemicals in the market, the price (which would be expected to rise as controls come into place and legitimate supplies diminish) and the growth in market share of legal alternatives.

The cases of illegal trade in HCFCs mentioned in this report are derived from reported seizures, and information from industry and enforcement agencies. Appendix 1 shows documented cases of seizures involving HCFCs as of January 2011. These are found from research, and thus should be considered as only representative. It is expected that there will be a lot more cases than those included. The case studies outlined below indicate that in most instances the smuggling methods used are similar to those used in the past for CFC smuggling (see box on page 5).

The largest cases to date have occurred in China and France where illegal exports of HCFCs have been prevented and in the US and India where illegal imports have been seized. Recently informal consultations have prevented illegal trade of 100 MT of HCFC-141b in the Central Asia / South East Asia region.

REGIONAL AND GLOBAL ENFORCEMENT OPERATIONS

From 2006 to 2009 the World Customs Organisation's (WCO) Regional Intelligence Liaison Office for Asia and the Pacific (RILO-AP) conducted a regional enforcement operation, called Project Sky-hole Patching, targeting hazardous waste and illicit ODS.[32] Partners included customs administrations and environment authorities, United Nations Environment Programme Regional Office for Asia and Pacific (UNEP ROAP), the Compliance Assistance Programme (CAP) of UNEP's Division of Technology, Industry and Economics (DTIE), Basel Convention Regional Centres and other key international organizations. In terms of ODS, the operation led to 51 seizures

totalling 730 MT. Although the bulk of the seized ODS was CFC-12, there were also cases involving HCFCs. For instance between September 2006 and December 2009 China customs seized 100 MT of HCFCs in nine separate cases, with the shipments bound for Europe, the Middle East and South-East Asia.

In 2010 Customs officers from over 80 countries conducted a six-month global project to monitor the trade and fight against ODS smuggling. This project was entitled Sky-hole Patching Project II, and was supported by the WCO, UNEP and National Ozone Units (NOUs).[33] The operation led to the seizure to 108 MT of illicit ODS and 668 items of ODS-containing equipment. The largest single seizure in the project was of 44 MT of HCFC-22 intercepted by French customs prior to export.

Asia Pacific:

Despite rapidly increasing domestic HCFC production a number of countires in the Asia-Pacific region have suffered from ongoing illegal trade. A number of cases of illegal trade with bordering countries have been reported but since there is in general no centralised collection of information on ODS seizures the magnitude of this trade is largely unknown. Countries which have long 'porous' land borders make enforcement difficult, and typically HCFC-22 is smuggled from neighbouring countries, using concealment. Chemicals are often smuggled in small quantities then collected together to transport to users in the main towns where they are used.

The region has also begun to receive significant amounts of illegal shipments of HCFCs arriving at container ports, often mis-labeled as HFCs or HFC blends.

Europe and Central Asia:

This region has seen increased CFC and HCFC seizures during recent years and appears to some extent tocurrently be a 'hot-spot' for illegal trade. This may be partly due to increased customs awareness and training; however the geographical location of the region makes it susceptible to illegal trade. With the extensive land borders there have been a significant number of cases of ODS and ODS-containing equipment smuggled in trucks, cars and personal luggage, as detailed in Appendix 1. The region has also experienced unwanted imports from Article 2 countries; for example a recent seizure of 247 CFC containing refrigerators from the EU to the region mis-declared as 'humanitarian aid' suggests that customs in developed countries should be aware of the illegal export of obsolete ODS-containing equipment.

Europe:

In 2009 an attempt was made to export recycled HCFC-22 into a European country. The exporter planning to ship the HCFCs is known to have used the fake reclaimed material scam in the past when shipping illicit CFCs to Europe. The country from which the attempted export was made currently does not have any licensed HCFC reclamation facilities. The competent authorities in the importing country refused the shipment.

In southern Europe it is estimated that up to 10 small ships a day are ferrying small consignments of HCFCs between ports bordering the EU where trade controls are not in place, and ports within the EU where import of virgin HCFC is banned.[34]

BELOW:
CFCs falsely labelled as HFCs, Philippines.

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US:

Recent HCFC seizures in the US suggest an already large black market with the potential to rival that seen with CFCs. In 2008 US customs seized 11 container loads amounting to 12,000 cylinders in Charleston, South Carolina with a market value of USD $1 million.[35]

An even bigger case came to light in 2009. The Kroy Corporation imported 29,107 cylinders containing 418 MT of HCFC-22 in 11 separate shipments with a market value of almost USD $4 million.[36] US courts prosecuted two individuals, sentencing one to 30 months imprisonment and another faces a maximum imprisonment of two years. The Kroy Corporation was fined USD $40,000 and ordered to forfeit USD $1.3 million.

Analysis of the methods used by the Kroy Corporation to smuggle HCFCs into the US has shown similarities with previous cases of CFC smuggling. The company illegally imported HCFC-22 using a mixture of methods, including:

Mis-declaration - declaring the HCFCs as either HFCs or "United States Goods Return"; and using double layering to hide the contraband HCFCs behind a layer of HFCs.

Transhipment fraud - although the HCFCs originated in Asia the consignments were routed via the Caribbean to avoid detection.

In March 2010 the US Attorney in the Southern District of Florida, responsible for the successful prosecution of the Kroy Corporation, concluded another case involving illegal trade in HCFCs. The defendant, Mar-Cone Appliance Parts, was placed on probation and fined after being found guilty of purchasing and selling 101 MT of black market HCFC-22 valued at approximately USD $850,000.[37]

The fact that both the Kroy and Mar-Cone cases centred on the state of Florida – a major international trade hub – is instructive; it was here that large-scale smuggling of CFCs first emerged in the mid-1990s.

Unscrupulous traders will go to many lengths to divert detection of contraband ODS. Experience of common methods and tactics used to smuggle CFCs over the past decade offers useful insights into how a black market in HCFCs may propagate. Early seizures of HCFCs indicate that the same methods are being used time and time again. By taking on board lessons learnt from previous seizures customs and NOUs in Article 5 countries can go a long way towards preventing wide scale HCFC smuggling.

COUNTERFEITING AND CONTAMINATION

An increasingly widespread and worrying technique involves the sale of cylinders labelled as "R-134a" (HFC-134a, a non-ozone depleting refrigerant). Analysis of these cylinders reveals that they contain a mixture of refrigerants including HCFCs, CFCs and sometimes

BELOW:
Illegal CFCs and HCFCs, India.

hydrocarbons. These counterfeit cylinders are flooding markets across Africa, West Asia, Central Asia and Eastern Europe. In West Asia it seems the unlabelled product is imported from Asia and then repacked locally.[38] The problem of contaminated mixtures is widespread and has persisted since the CFC phase out. Cases from Georgia, Sudan, Kuwait, the Philippines, Thailand, Mozambique and St Kitts have been recorded.[39]

It is thought that these highly contaminated mixtures are recovered from many pieces of RAC conditioning equipment and put directly by unscrupulous traders into 'R-134a cylinders' without any treatment or checking.

Two regions appear to be having specific problems regarding the scale of the use of these blends. In 2006 a major chemicals manufacturer, DuPont, issued details of contaminated mixtures found in a number of Middle Eastern countries. These were falsely labelled with trade names of legitimate products including Suva™, Freon™, ISCEON™ and Genetron™ – many contained obvious mistakes, such as incorrect spellings (isceon, Genatron), badly reproduced logos and incorrect colours as well as wrong chemical names, customs codes or UN/CAS numbers. Again in 2009 DuPont issued a warning about the use of contaminated mixtures across the West Asia region. They believed these were coming in unlabelled from Asia then being repackaged possibly in the Middle East.

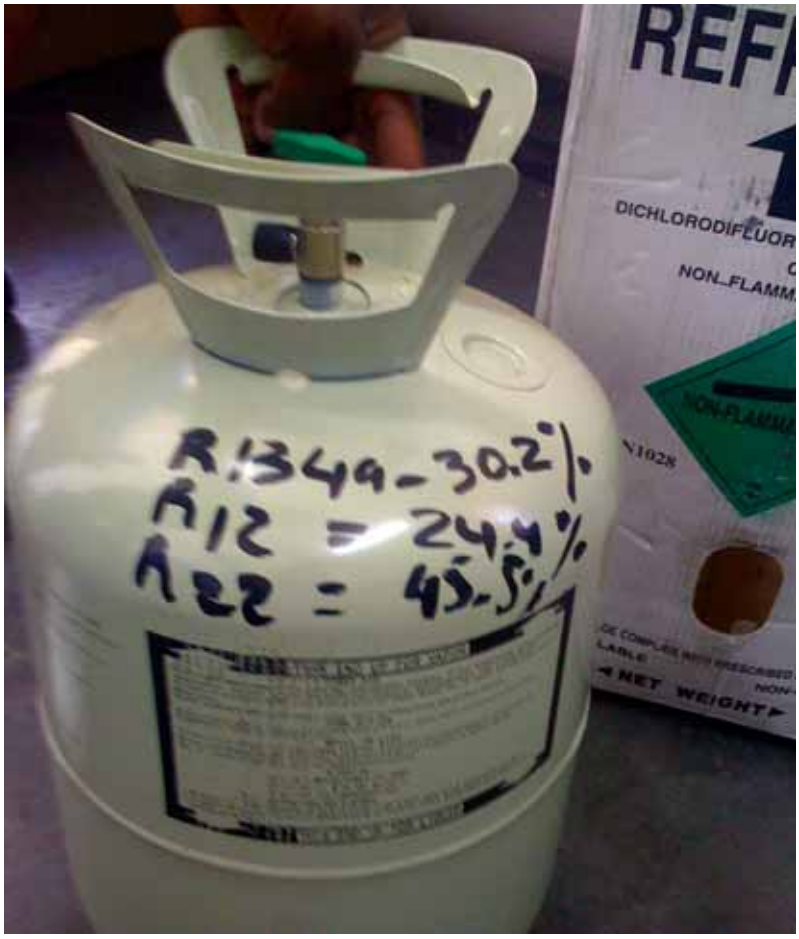
Many African countries frequently report that imports of cylinders of HCFCs, and previously CFCs, do not contain the gases indicated on the cylinders and packaging. Analysis of the cylinder contents often reveals a 'contaminated' mixture of gases – which constitutes mislabeling and could cause damage to equipment if used. For example in a recent customs training workshop in Mozambique sample cylinders of HCFC-22 purchased from a refrigeration retail outlet were found to contain only 88% HCFC-22 in addition to HFC-134a and other gases. Cylinders of CFC-12 were found to contain only 24% R-12, the majority of the contents comprising HCFC-22 and HFC-134a.

As well as seriously affecting the performance of the equipment they are used in, the contaminated mixtures can also pose significant health and safety risks for the equipment owners, operators and servicing technicians.

During a customs officer seminar in Armenia in 2007 some cylinders of R-134a picked at random for demonstration purposes during the training were found to contain a heavily contaminated mixture of refrigerants including HCFCs and CFCs. The importer, a leading RAC manufacturer in Armenia had been unknowingly filling brand new compressors with the contaminated mixture, claiming to be unaware of the true contents.[40] These contaminated products traded by smugglers cause economic and reputational damage to the entire RAC chain in a country: importers, RAC manufacturers, distributors, end users and servicing technicians.

The likely reason for the ongoing availability of these contaminated mixes is due to the financial gains made by companies involved. These counterfeit goods are often sold at half the market price of authentic refrigerants as they cost very little to produce. Clearly steps need to be taken to address this ongoing problem. Adding HFCs to licensing systems and risk profiling would greatly help detection of fraudulent blends, countries should consider whether it is possible for them to do so. Also raising awareness of the safety implications with refrigeration technicians may help.

BELOW:
Chemical composition of a contaminated mixture labelled as R-134a analysed in Mozambique.



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Section 5: **POLICY RESPONSES**

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As illegal trade in ODS is often opportunistic, involving criminals exploiting loopholes in national regulations, part of any effective response to reduce smuggling should include policy measures aimed at removing opportunities for illegal trade. UNEP has produced extensive guidance on policy measures aimed at curbing illegal trade to assist Article 5 countries in implementing HCFC phase-out management plans.[41]

This section analyses several instrumental policy options which all Parties to the Montreal Protocol should consider fully implementing in order to abate the threat of illegal trade in HCFCs and other ODS. It also considers other tools available to prevent and combat smuggling.

LICENSING SYSTEMS

The establishment and enforcement of licensing systems has been the main accomplishment of the Montreal Protocol in combating illegal trade in ODS. Under the 1997 Montreal Amendment all Parties which ratify it are required to "*establish and implement a system for licensing the import and export of new, used, recycled and reclaimed controlled substances.*"[42]

Operational guidance is given via Decision IX/8 of the Parties which states that: *"the licensing system to be established by each Party should… assist Parties in the prevention of illegal traffic of controlled substances, including, as appropriate, through notification and/or regular reporting by exporting countries to importing countries and/or by allowing cross-checking of information between exporting and importing countries."* Licensed companies are usually issued with annual quotas which limit the amount of ODS they are able to import each year. Used together licensing and quota systems combined with regular communication and cross-checking of import and export information are essential ingredients in creating effective licensing systems which can curb 'front door smuggling'[43] and help Article 5 countries meet HCFC phase-out targets.

HCFC Licensing

Under the Montreal Amendment all Parties are required to licence import and export of all ODS. Article 4B states that countries operating under Article 5 of the Montreal Protocol must establish licensing systems for HCFCs (Annex C substances) by January 2005. It is important to note that Article 4B of the Montreal Protocol requires all countries to establish licensing systems covering both import and export of ODS and mixtures containing ODS, so even if the country is not an ODS producer the re-export of imported ODS has to be licensed.

If implemented and enforced properly ODS licensing and quotas offer an important means of monitoring and controlling trans-boundary trade. Lack of controls for HCFC exports can allow countries with weak licensing systems to import HCFCs in excess of their domestic consumption quotas providing a surplus of HCFCs which may be sold on the black market or exported freely. A failure to regulate exports means that data reported to the Ozone Secretariat may be inaccurate, and shipments may be easily diverted onto illicit markets.

To date more effort has been devoted to establishing import licensing systems than to export licences, as far more countries are importers than exporters. It is apparent that while countries currently licence or plan to licence

HCFC imports, the number of countries currently licensing exports is considerably less, this may indeed be because they are not HCFC exporters. This lack of coverage for exports is reflected by the Ozone Secretariat analysis of HCFC export reporting in 2008 which revealed 34,303 MT of HCFCs were reported as exported with no specified destinations.[44]

Requiring mandatory reporting for HCFC importers and exporters

Mandatory reporting by HCFC importers and exporters is an integral aspect of successful licensing systems and is necessary to ensure accurate Article 7 data reporting. It is insufficient to rely on customs data alone as often Harmonised System (HS) codes used do not distinguish between each type of HCFC. Amendments to HS codes due to be introduced in 2012 will reduce the number of codes for CFCs and increase those for HCFCs. However not all refrigerants will have their own code. Cross checking of data reported by importers and exporters with customs data can also help reduce illegal trade as data discrepancies can lead to the discovery of illegal shipments.

Issue permits for HCFC in transit

Transit trade (or transhipment) within the Montreal Protocol refers to goods shipped through a third country, without leaving the port, designated bonded warehouse, store or railway wagon, on their way from the country of origin of the goods to the country of final destination.[45] The role of transit countries in illegal HCFC trade is of particular concern as transhipment facilitates smuggling by confusing the trail of the material and provides a jump-off point into illegal markets. Unlike some other international agreements, the Montreal Protocol has no specific requirement for transit licenses, Decision III/13 places data reporting responsibility with the original exporting country.

One way of countering this threat is to issue licences for ODS in transit. Transit through free trade zones is a particularly high risk area for illegal trade, due to the relaxation of customs controls and often lack a process of issuing transit permits to cover goods being transhipped.

Issue permits for HCFCs on per shipment basis

Issuing permits on a per shipment basis helps countries closely monitor their consumption and therefore their ability to remain in compliance with Montreal Protocol targets. It is essentially just an extension of the basic HCFC quota system but instead of issuing a quota to a company for a specific period of time a permit is issued on a per shipment basis. On average about half of Article 5 countries either currently do or plan to issue permits for HCFCs on a per shipment basis.

Extend licensing system to cover HFCs and HFC-containing mixtures

Few Article 5 countries currently incorporate, or plan to incorporate, HFCs into licensing systems. The unpopularity of this measure may be because HFCs are not controlled substances under the Montreal Protocol. Another reason revealed in discussions with some NOUs was the concern that if HFCs are licensed then smugglers would just label illicit ODS as a different refrigerant product and the problem would remain. Yet this does not take account of the serious problem encountered with counterfeit R-134a cylinders. HFC-134a is a popular refrigerant across developing countries and trade in contaminated counterfeit mixtures is not just illegal but can pose serious health and safety risks. In addition several seizures of HCFCs have revealed the mis-declaration of the contraband as HFCs. By including HFCs in licensing systems it may be possible to reduce the prevalence of counterfeit R-134a and improve traceability.

BELOW:
Illicit ODS, seized in the Philippines, 2005.

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DATA ANALYSIS

Analysis of import and export data helps to assess whether licensing systems are working as desired. Up until 2005 Parties were only required to report imports to the Ozone Secretariat. However in an attempt to improve reporting and prevent illegal trade in ODS, Decision XVII/16 modified reporting requirements to cover exports of all ODS as well as imports and requested the Ozone Secretariat to report back aggregated information related to the controlled substance in question received from the exporting/re-exporting Party to the importing Party concerned.

An assessment carried out by EIA and Chatham House in 2006 found widespread discrepancies between import and export data reporting for all ODS, including HCFCs. Most discrepancies involved imports exceeding exports.[46]

In a recent analysis by the Ozone Secretariat large discrepancies between reported imports and exports were revealed.[47] The reasons behind such discrepancies are not known. They could indicate possible difficulties faced by Parties in reporting substances accurately.

Data derived from the UNCOMTRADE (United Nations commodities trade statistics) database shows significant HCFC trade reporting discrepancies.[48] Below are some examples, in each case real country import and export data is used, although the specific country is not identified.

Figure 7 shows an increasing reporting discrepancy between these two countries. From 2005 to 2009 the reported HCFC exports were on average 60% higher than reported imports.

Figure 8 shows a large discrepancy between the reported HCFC imports and reported export between these two countries. Over the period 2005-2009 the reported HCFC exports were 2.4 times larger than the reported imports.

There could be several reasons for these discrepancies. It could be due to inadvertent mis-declaration of the destination country, or subsequent re-export from the destination country, or error in reported imports. However it could also be an indication of illegal trade, e.g. criminals illegally diverting HCFC shipments after they leave one country so that they never reach the intended country of import.

FIGURE 7

Data comparison between reported HCFC exports and reported imports from two countries in South-East Asia between 2005-2007.

Source: UNCOMTRADE

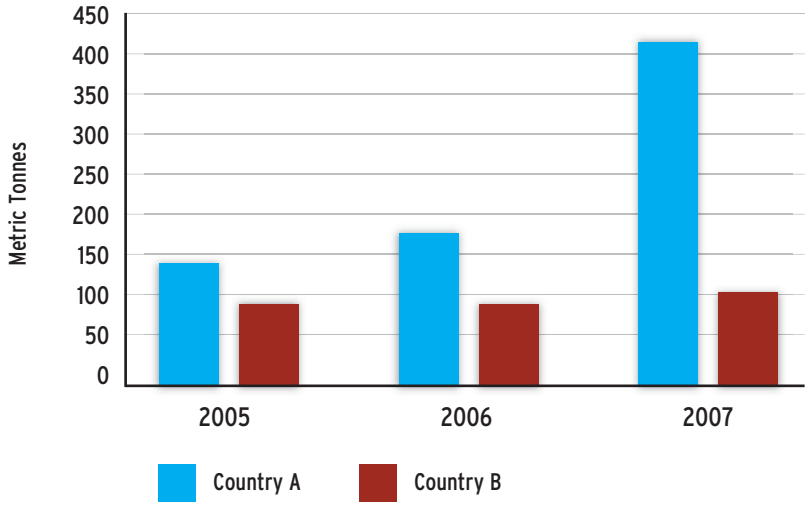
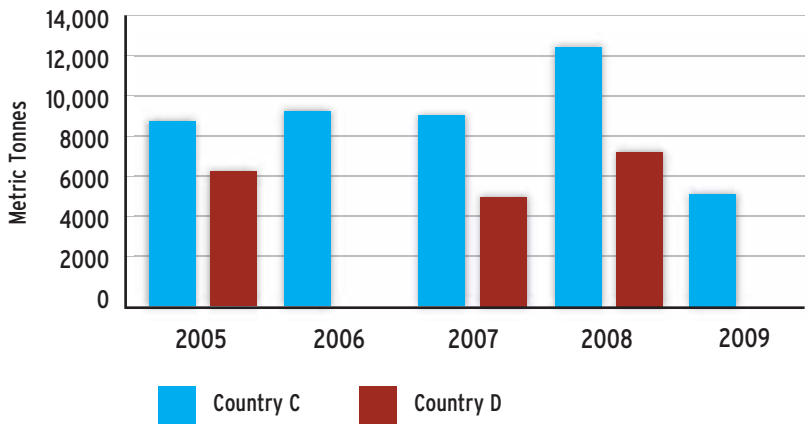


FIGURE 8

Data comparison between reported HCFC exports from a country in Asia with reported imports from a country in the Middle East, between 2005-2009

Source: UNCOMTRADE



HCFC EQUIPMENT CONTROLS

A relatively simple way of reducing demand for HCFCs is to stop the flow of HCFC- based equipment onto the market. The Montreal Protocol does not impose controls on products or equipment containing or relying on ODS (except for a ban on imports from non-Parties of products and equipment containing ODS in Annexes A and B). However certain countries and economic organizations have introduced trade restrictions not only on ODS but also on products and equipment containing ODS or relying on ODS.

Although the Montreal Protocol doesn't apply to trade in HCFC-based products, curtailing availability of such equipment (particularly RAC) by national authorities will reduce the bank of HCFC-reliant equipment and will help countries in ensuring compliance. Currently around half the Article 5 countries have either banned or plan to ban the import or placing on the market of HCFC-based equipment.

In order for this policy measure to be effective it is essential for NOUs and customs in trading partner countries to be aware of any such bans. One method to share this information is through the Informal Prior Informed Consent initiative (iPIC) (see page 18), however not all countries which ban the import of HCFC-based equipment are part of this initiative.

Currently the Ozone Secretariat website hosts details of Parties not wishing to receive products and equipment relying on Annex A and B Substances. As HCFCs are Annex C, they are not included in this list. Countries may wish to consider requesting the Ozone Secretariat to expand this facility to include HCFCs and encouraging all Parties to update the list.

BANNING THE USE OF DISPOSABLE CYLINDERS

The vast majority of ODS smuggling is facilitated by the use of disposable cylinders (sometimes referred to a "non-refillable containers"), as their disposable nature means they can be freely traded. Therefore removing them from the market would make illegal trade in HCFCs much more difficult. However banning their use is currently not a popular policy option in Article 5 countries. The reluctance to adopt this measure may be due to some of the challenges involved to businesses acquiring fleets of refillable cylinders. One way to address this could be to highlight the business advantages of using refillable containers; primarily that it creates customer loyalty and that initial costs can be recouped through deposits or rental fees. Governments could also consider issuing loans to cover the initial capital costs involved. Within the US, industry has suggested that refillable cylinders have a larger carbon impact over the recycling containers due to the extra transportation involved.

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ABOVE:
Refrigerant identifier being used to check cylinder contents.

EFFECTIVE COMMUNICATION

Though not an actual policy measure in itself, effective communication can be enhanced via policy support. Strong communication between customs and other border enforcement agencies, ODS-regulating agencies and external stakeholders within a country is necessary to ensure licensing systems are operating correctly. Customs officers, responsible for monitoring trade in a huge variety of products, of which ODS forms a small proportion, cannot be expected to have an exhaustive knowledge of the topic – which means that communication and exchange of information with the responsible departments is vital. Public awareness campaigns also play a central role in reducing consumer demand for phase-out refrigerants and should be considered when creating national policy.

Decision XIV/7 requested the Executive Committee of the Protocol's Multilateral Fund to carry out an evaluation of 'customs officers training and licensing system projects'. The report was presented to the 25th Open-Ended Working Group in 2005.[49] It evaluated licensing systems in nine Article 5 countries and highlighted the need for good communication between different government agencies, primarily those responsible for regulating ODS and the customs agencies which check imports and exports. One year later in-depth data analysis and interviews with NOUs and Customs by EIA and Chatham House revealed that in many cases these communication channels do not exist, or are cumbersome and ineffective.[50] One reason given was that customs authorities also often prove reluctant to release import data to environment agencies (sometimes for reasons of commercial confidentiality) or may only release it several months later.[51]

ODS producers and related industry can also play an important role in combating illegal trade in HCFCs. Often ODS producers have reliable market data which can indicate areas where the uptake of alternatives is not happening as anticipated. Increased engagement with these stakeholders may help with risk profiling efforts.

INFORMAL PRIOR INFORMED CONSENT (iPIC)

In order for licensing systems to work efficiently, prior to issuing a company with a licence for export, custom officers or NOUs from the exporting country should verify that the exporter is within its quota and that the importer is licensed. In order to facilitate information cross-checking, UNEP OzonAction CAP has encouraged the use of ODS licensing sheets and cross-checking of licensing information via a voluntary system of Informal Prior Informed Consent (iPIC). ODS licence sheets contain country data on licensed exporters, importers and relevant quotas.

Background

Prior Informed Consent (PIC) is used in some multilateral environmental agreements. For example the Rotterdam Convention, which covers trade in certain hazardous chemicals and pesticides, uses the PIC procedure as a means of formally obtaining and disseminating the decisions of importing countries on whether they wish to receive future shipments of such chemicals. At the core of any PIC system is the notion of shared responsibility.

When applied to ODS trade it is used as a process by which participating countries agree to share information prior to issuing export or import licenses. The key objectives of iPIC are: effective implementation of licensing systems, maintaining compliance, and prevention of illegal trade in ODS.

The genesis of ODS trade-related iPIC began in the early 2000's through bilateral agreement between countries experiencing problems with illegal trade in the Asia-Pacific region. Over recent years iPIC has been expanding and by 2010, 71 countries were participating.[52] Most participating countries are Article 5 countries. However, in recognition of the existence of illegal trade to and between Article 2 countries the EU, Australian, Japan, New Zealand and Israel also participate.[53]

Since 2007, over 50 unauthorized ODS shipments have been prevented, thanks to iPIC. During 2009, 11 cases of illegal trade were avoided.[54] In 2010, 96 cases of potentially illegal trades were screened and verified through the mechanism, resulting in the prevention of 24 unauthorized shipments[55] totalling more than 1000 MT of unwanted ODS. iPIC has also helped countries ensure compliance quotas are adhered to. For example, one query led to the reduction in the quantity of ODS allowed for export to bring the amount in line with the importer's quota.[56]

In addition to its original purpose of preventing illegal and unwanted trade, iPIC has also contributed to increased mutual co-operation between the licensing officers and has become a platform to exchange information and knowledge. Furthermore, it assists countries in the effective enforcement of their national licensing system, for example by identifying companies that are unintentionally unaware of existing obligations.

The effectiveness of the system would be considerably greater if it had greater coverage in some other key regions, such as the North America and Africa, and some other ODS producing

BELOW:
Informal prior informed consent is useful in tracking ODS shipments.

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countries; without this information it makes it much more difficult for importing and exporting Parties to cross-check information. In some cases licensing sheets are not fully completed and incomplete information makes the system less effective.

iPIC SUCCESSES

European Union:

The EU has been participating in iPIC since March 2007. Since this date iPIC participation has prevented 900 MT (270 ODPT) of unwanted ODS trade with EU Member States.[57]

Following the recast of Regulation (EC) No 1005/2009 on substances that deplete the ozone layer, as of January 2010 all ODS imports and exports are subject to iPIC – including HCFCs.

In 2010 the EU had 2307 trades with iPIC registered countries, of which 106 were HCFC imports and 1069 were HCFC exports.[58] Of the total ODS trades, 104 involved an exchange with NOUs, resulting from these exchanges 25 requests were rejected, equating to 16 ODP tonnes. The EU has concluded that "the iPIC procedure has proven a useful tool for avoiding unwanted or illegal trade without creating too much administrative burden."[59]

A recent example of avoided illegal trade from the EU occurred in September 2010 when a company applied for a licence concerning import of recycled CFCs from a company in the EU. However consultation of the EU's iPIC Information Sheet revealed the exporter was only registered for export of halons. Communication between the country and EU NOUs confirmed that the export of CFCs from the EU would only be possible for feedstock uses, as process agent, or for essential laboratory uses. For all these applications it was unlikely that non-virgin CFCs would be used. The country therefore rejected the importer's application.[60]

Serbia:

In 2010 involvement in the iPIC network resulted in two cases of avoided trade by Serbia. In February an importer attempted to import of 7.3 MT of HCFC-22 and 2.7 MT of R-406a However consultations with the NOU of the exporting country revealed that the exporter was not eligible and the importer withdrew their application.[61]

China/Israel:

Use of iPIC between China and Israel in a case involving shipment of recycled CFCs revealed the use of fraudulent government documents by a Chinese exporter.

China/Trinidad:

In April 2010 China inquired about a requested export of about 16 MT of Methyl Bromide to Trinidad and Tobago. The inquiry was relayed to the OzonAction ROLAC CAP team and then to Trinidad and Tobago immediately. After checking licensing records for ODS, the Ozone Officer of Trinidad and Tobago confirmed that the country did not issue any licence for the import. Consequently, China rejected the application of the exporter.

China/Russia:

In January 2011 informal consultations between China and Russia prevented illegal trade of 100 MT of HCFC-141b because the importer in St. Petersburg was not registered and had no import licence. China did not issue the export licence.

IMPLEMENTATION OF THE BEIJING AMENDMENT

The Beijing Amendment to the Montreal Protocol was agreed in 1999 and came into force in 2002. It establishes production and consumption controls for Annex C Group III ODS, HCFCs. It also places restrictions on HCFC trade with those Parties that have not ratified the Amendment ("non-Parties"). In the case of Article 5 countries the term non-Party does not apply until after 1 January 2013. Therefore, as of 2013 any Party which has ratified both the Beijing and Copenhagen Amendments should ban HCFC trade with non-Parties.

As of January 2011 a total of 166 countries had ratified the Beijing Amendment. However some large HCFC importers have not yet signed.[62] Failure to ratify the Beijing and Copenhagen Amendments can cause disruption of HCFC trade as theoretically Parties are not supposed to trade HCFCs with non-Parties. It may also delay implementation of some HCFC phase-out management plans (HPMPs). At the Montreal Protocol Executive Committee's 62nd meeting in November 2010 approval of one country's HPMP was delayed due to its prolonged failure to ratify the Amendments, which is a precondition for funding.

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Section 6: **THREAT LEVEL POSED BY ILLEGAL HCFC TRADE**

As illegal trade in HCFCs is already a reality, it is important to gauge the possible level of threat in the future to assist in planning policy and enforcement responses. Quantitative risk assessment methods can be a useful tool. Identifying the vulnerabilities contributing to risk is essential in meeting the task of mitigating that risk. Risk can be assessed in various complex ways however this is challenging when the data is qualitative rather than quantitative in nature. A simple method is to consider the potential loss and the probability of the loss occurring.

In the case of HCFC smuggling losses incurred and factors affecting the probability of those occurring are numerous. Globally, illegal trade erodes the success of the Montreal Protocol and delays ozone layer recovery. It undermines compliance with Multilateral Environmental Agreements and related investment. At a national level smugglers avoid customs duties and taxation, reducing state income and undermining governance. It also threatens legitimate businesses, eroding the values of society. ODS smuggling has significant health and safety costs and damages the RAC chain. The scale of losses associated with illegal trade in ODS are severe, their impact will depend upon the magnitude of illegal trade which is determined by the likelihood of it occurring.

Environmental crime has also been linked to trans-boundary organised crime. A recent West African seizure of cocaine and ODS highlights this concern. In June 2010 Gambian enforcement officers participating in the Sky-hole Patching II operation detected several cylinders of CFCs smuggled from South American along with 2 MT of cocaine.[63]

FACTORS AFFECTING THE RISK OF ILLEGAL TRADE OCCURRING

Price differentials

Demand for smuggled goods will have a big impact and price differentials between HCFCs and their alternatives play a key role. Currently prices for alternatives to HCFCs in developing countries are high, for example HFC-134a is about two and a half times more costly than HCFC-22 in China.[64] This large price differential poses a significant challenge as it makes consumers and manufactures more resistant to use restrictions. A recent investigation by the UN's Methodologies Panel concluded that Clean Development Mechanism (CDM) revenues may have artificially suppressed the price of HCFC-22.[65]

Past experience

The recent steep growth in HCFC consumption witnessed in Article 5 countries is likely to cause significant problems for the phase-out, outstripping that seen for CFCs in the lead up to the baseline. Figures 9 and 10 opposite detail CFC and HCFC consumption (in ODP tonnes)in developing countries in the decade prior to the establishment of the baseline.

Looking back at the decade prior to the establishment of the CFC baseline detailed in Figure 9 growth was much lower and more variable. Overall CFC consumption grew by a factor of 1.3 compared to the factor of 2.6 witnessed for the decade prior to the establishment of the HCFC baseline.

Figure 10 detailing HCFC consumption reveals both stronger growth and a larger overall market size than that seen for CFCs. In the mid-nineties global CFC consumption peaked at about 189,000 MT per annum.[66] Current global HCFC consumption is about 641,331 MT per annum and it is growing.[67] At its peak illegal trade in CFCs represented about 20% of legitimate trade.[68] If the same situation were allowed to occur for HCFCs the consequences would be dire.

Another lesson given by experiences during the CFC phase-out is how the black market can be dominated by demand for specific refrigerants in certain sectors. With CFCs, CFC-12 was the most commonly smuggled ODS, especially in non-refillable cylinders. This is because it was used in the RAC servicing sector, in contrast to other sectors such as manufacturing and foam production is characterised by a large number of companies that are geographically dispersed. The servicing sector also includes many business operations in the informal sector. The situation is similar for HCFCs, with demand for HCFC-22 for RAC servicing posing the most significant risk of illegal trade.

However, there may also be a growing number of cases of illegal trade in HCFC-141b that has been used in large quantities as foam blowing agent, and its use is now banned in several countries, including the EU and the USA. Since HCFC-141b is also a good solvent recommended for specialty applications, and there is a considerable demand for that type of solvent as the price of alternatives is much higher, trading it illegally under the commercial names only without revealing chemical composition and under the HS customs code of "composite solvents" has also been recorded.

Enforcement

Enforcement is a key tool in combating illegal trade and reducing the risk of future trade and effective enforcement networks are integral to this. However with the current focus on funding of HPMPs in the Executive Committee, enforcement activities are currently not considered to be a priority and hence have recently not received Multilateral Fund support.

Detection is only part of effective enforcement, adequate punishment of crimes is an essential deterrence. Often punishments for ODS-trade related crimes are lax and fail to act as effective deterrents. This may be because many criminal justice systems do not afford a high priority to this type of environmental crime. Equally, important is dissemination of information relating to seizures and arrests since communicating successful prosecutions increases this awareness, and smugglers react to the perceived threat of punishment for their crimes.

Since the first cases of ODS smuggling emerged in the mid-1990s the Montreal Protocol's awareness of and actions to tackle illegal trade have greatly increased. Today customs training is

FIGURE 9

CFC consumption (ODP tonnes) in Article 5 countries from 1986-1998

Source: Ozone Secretariat

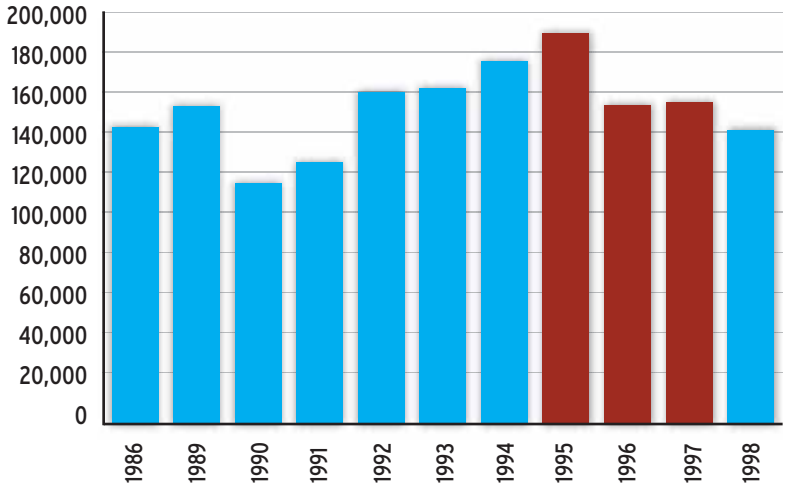
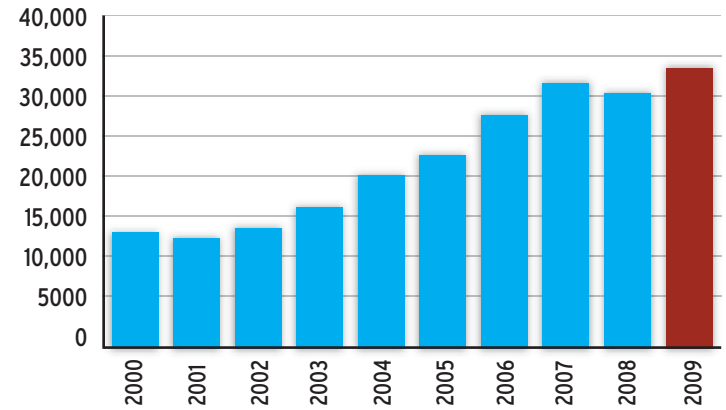


FIGURE 10

HCFC consumption (ODP tonnes) in Article 5 countries from 2000-2009

Source: Ozone Secretariat



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ABOVE:
Controlling trade in HCFC-based equipment can assist the phase-out process.

an integral part of the Protocol's activities. Other strengths include: improved cooperation and communication between customs agencies and their partners; increasing use of iPIC (see Section 5) which has led to several cases of avoided illegal trade; effective enforcement networks; and increasing regional and international cooperation.

Trade in HCFC-based equipment

Some industry sources working in Article 5 countries have raised concerns that developed countries are exporting used HCFC refrigerant and HCFC-based equipment to developing countries. This practice is driven by profit, as it can often be cheaper to ship unwanted ODS and ODS-based goods to developing countries than pay for their proper recycling and destruction in developed countries.

Following the ban on use of virgin HCFCs in the EU from 2010 HCFC-based equipment is rapidly becoming obsolete. It is possible that unwanted equipment may be illegally exported to neighbouring countries, creating further demand for HCFCs in Article 5 countries and CEITs (Countries with Economies in Transition). Land borders with EU Member States can be hard to police and countries on the eastern fringe of EU borders are most likely to be worst affected. Although the Montreal Protocol doesn't regulate trade in ODS-containing equipment among Parties to the Protocol, under the EU Ozone Regulation, the export of products and equipment containing or relying on ODS is prohibited.[69]

Allowing imports of HCFC-based equipment into a country can pose problems for the HCFC phase-out as it increases the bank of equipment and demands from the servicing sector. A country's capacity to reduce demand for HCFCs and thereby reduce the risk of illegal trade in HCFCs will depend upon its ability to control the bank of installed equipment. As was discussed in Section 5 banning the import and placing on the market of HCFC-based equipment is a useful HCFC phase out tool. However, as was the case with the CFC phase-out, HCFC-based equipment is already being smuggled. Annex 1 details seizures of HCFC containing RAC equipment between 2002-2007.

Decision X/9 invites Parties that ban the importation of equipment containing controlled substances in Annex A or B to transmit that information to the Ozone Secretariat and for that list to be distributed to all Parties by the Secretariat. As Annex C controlled substances (HCFCs) are not currently integrated into this decision, it would be useful to consider updating Decision X/9 to enable the Secretariat to distribute information on HCFC-based equipment controls.

HCFC production for feedstock

In addition to their use as refrigerants, solvents, aerosol propellants and foam blowing agents HCFCs are also used in feedstock applications in the manufacture of chemicals such as PTFE used in Teflon and in the manufacture of pharmaceuticals and agricultural products.[70] Feedstock uses are not controlled by the Montreal Protocol as it is understood that they are intermediate 'non-emissive' applications. Though feedstock use is commonly known as non-emissive one, in fact emissions of HCFCs from feedstock uses are considerable.

Historically non-Article 5 countries have dominated HCFC feedstock production however HCFC-22 feedstock production in Article 5 countries has grown steadily and in 2007 the TEAP documented signs that production could be shifting from developed to developing countries, possibly due to lower production costs.[71]

In contrast to future reductions in HCFC production and consumption for emissive uses, global production of HCFCs for feedstock is likely to continue growing. During 2010 demand for HCFC-22 for intermediate use was expected to reach 380,000 MT, overtaking production for emissive uses. This is expected to continue rising to 495,000 MT by 2015.[72]

The vast majority of HCFCs used for feedstock is HCFC-22. It is possible that the large amounts of unmonitored HCFC feedstock production in developing countries could become a source of black market HCFCs in future. This threat to the Montreal Protocol has been recognised by its Multilateral Fund which has suggested monitoring HCFC feedstock producers.[73]

The likelihood of feedstock HCFCs being diverted onto black markets will significantly increase as Article 5 countries take on deeper production cuts in line with their commitments under the Montreal Protocol. It will also be affected by growing demand for HCFCs, this demand is likely to be highest when high volume consuming countries phase-out HCFC-22 in the servicing sector. Other exempted uses of HCFCs i.e. process agent uses, laboratory and analytical uses may also be diverted to other destinations. This also remains a concern for HCFCs exported/imported for destruction.

LEVEL OF THREAT

Figure 11 graphically displays the anticipated forecast of how illegal trade in HCFCs may vary significantly between regions and a country's specific circumstances.

It is thought that Low Volume Consuming (LVC) countries and those with no manufacturing sectors are at high risk of illegal HCFC imports right now. This is because their consumption is dominated by demand from the servicing sector and early stage HPMPs will have little choice other than to address this sector. As alternatives to HCFCs are significantly more expensive there will be reluctance to switch. This risk is likely to drop off in LVCs as their consumption levels are generally low so the scale of illegal trade will gradually decrease. Countries with larger consumption will find it more of a challenge to reduce illegal trade and their risk remains high throughout.

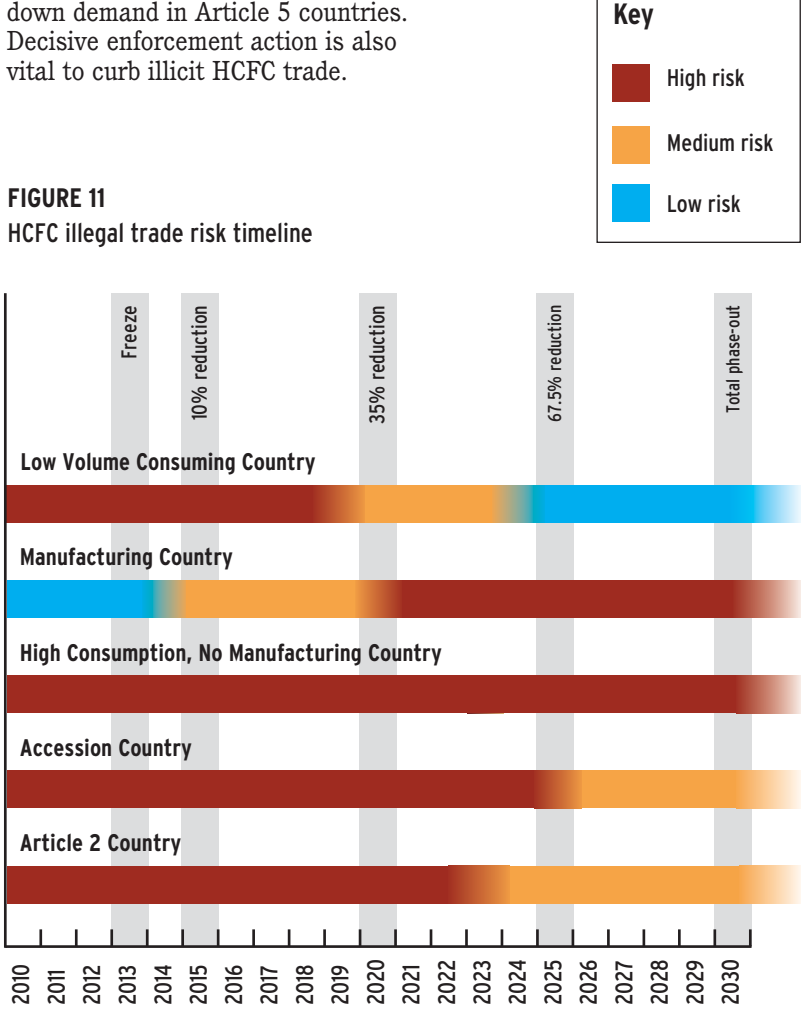
Similarly countries planning to join the European Union have the significant challenge of having to dramatically cut HCFC consumption to fit EU legislation, which is much stricter than general Article 2 requirements. Furthermore they will be at high risk of receiving illegal equipment imports from the EU as it curtails its use of HCFCs. It is likely that the risk will decrease towards 2020 if they have succeeded in joining the EU, as the EU will have totally banned the use of HCFCs, including recycled material, from 2015.

Manufacturing countries are most likely to see a surge in illegal trade towards Stages 2 and 3 of the phase-out as Stage 1 will focus on HCFC-141b, then HCFC-22 in manufacturing sectors.[74] It is essential that the manufacturing phase-out is closely monitored to ensure demand for HCFCs does drop off. HCFC producer countries are already at high risk of illegal exports in order to meet growing black market demand from other countries.

Article 2 countries such as the US are already experiencing high levels of illegal trade, it is likely that the risk and scale of illegal imports will increase over the coming decade up until a few years after the final phase-out date of 2020.

Illegal trade in HCFCs is already happening. The potential threat of the problem escalating over the next decade depends on the degree to which effective policies to counter HCFC smuggling are implemented, and the effectiveness of HPMPs in dampening down demand in Article 5 countries. Decisive enforcement action is also vital to curb illicit HCFC trade.

FIGURE 11
HCFC illegal trade risk timeline



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Section 7: **RECOMMENDED ACTIONS**

Despite significant progress in tackling illegal trade in ODS over the past decade the future threat of illegal trade in HCFCs is high. Soaring production in Article 5 countries paired with deep consumption reductions in Article 2 countries set the stage for wide scale illegal trade in HCFCs. However Parties to the Montreal Protocol have all the tools they need to counter illegal trade in ODS. It is a question of implementing them. Used properly licensing systems and iPIC can help put an end to front door smuggling. This analysis has found HCFC licensing procedures currently to be inadequate for controlling a black market in HCFC. Increased customs awareness and intelligence sharing can help address ODS smuggling.

The Montreal Protocol's efforts to combat and control illegal trade have made it perhaps the most effective environmental treaty to date. Lessons learned on this subject could be useful for other Multilateral Environmental Agreements that have (or are considering) trade control measures.

RECOMMENDATIONS FOR ENFORCEMENT OFFICERS

Establish inter-agency task forces

Good cooperation between customs and other border enforcement officers and environmental inspectors and officers is essential. Joint efforts both at borders and inland have proved efficient in combating illegal trade in ODS. The US experience of combating illegal trade in ODS shows the value of setting up mechanisms to bring together relevant agencies at the national level. The US "Operation Catch 22" has already detected over 700 MT of contraband HCFC-22.

Utilize regional cooperation structures

The World Customs Organisation's Regional Intelligence Liaison Offices have a clear role to play in disseminating information on illicit ODS trade and organising joint operations. Countries should report all ODS seizures to RILO for inclusion in the Central Enforcement Network (CEN). Countries should also use the WCO ENVIRONET and INTERPOL's 'Ecomessage' system to share information securely.

Border dialogues to improve control of ODS trade

By including the issue of ODS illegal trade in regular border meetings this should improve information and intelligence exchange on ODS trade at the sub-regional level.

Training of Customs officers

As the role of Customs is key to monitoring international trade and combating trafficking of illegal ODS shipments customs officers should have access to training to increase their awareness and improve necessary skills. This can be done by several means, such as training under the framework of the Green Customs Initiative (GCI), by the regional networks of UNEP DTIE, and by NOUs at the national level.

Targeted enforcement

Customs authorities should routinely inspect shipments of HFCs since ODS are commonly mis-declared as these chemicals. Enforcement efforts should focus on potential "hotspots", for instance where neighbouring countries with different phase-out schedules or regulations share borders. Countries may wish to amend state regulations, if necessary, to ensure that offenders received adequate punishment and enforcement efforts should be well publicised to ensure the best deterrent effect.

Use latest ODS identifiers
It is important that the latest ODS identifiers (which can identify HCFCs and blends) are provided to enforcement officers to facilitate their work in the scenario of trade facilitation.

RECOMMENDATIONS FOR POLICY MAKERS AND NOUs

Licensing systems
Ensure all HCFCs are covered by licensing systems. Such systems should also include feedstock. Include HFCs and HFC-containing mixtures in licensing systems. Be sure that not only import, but also export licensing and transit trade is mandatory and mixtures containing HCFCs are included in the licensing systems.

Ban HCFC equipment trade
In order to stop the flow of unwanted equipment to Article 5 countries which would increase their HCFC bank. Article 2 countries should consider banning all HCFC-equipment exports to Article 5 countries (new and second hand). Decision X/9 should be expanded to cover Annex C controlled substances and Parties should regularly update the Ozone Secretariat regarding equipment bans.

Informal Prior Informed Consent
Countries not yet involved should join the iPIC initiative. Within iPIC participating countries should ensure that information sheets are up to date and comprehensive and respond to inquiries in a timely manner.

Monitor HCFC feedstock production
HCFC production for feedstock could become a source of black market HCFCs in the future. Parties to the Montreal Protocol may consider agreeing to monitor HCFC feedstock production and track its use.

Data reporting
When reporting import and export data to the Ozone Secretariat it would improve the quality of data and reduce data discrepancies if countries reported where they got their imports from, since at present imports are reported in aggregate. Many countries already have this more detailed data so it is just a case of amending the reporting form.

Industry Involvement
Establish mechanisms to exchange information with industry, as a useful source of market intelligence. For instance in the US the Alliance for Responsible Atmospheric Policy has issued warnings to its members to be on guard against sales of illicit HCFCs, and tells them what documents they need to check.

Transparency of Information
NOUs should publish the names of authorised HCFC importers, exporters, producers and sellers, as well as recycling facilities. The US EPA publishes a regularly updated list of firms holding unexpended consumption allowances. The EU publishes the names of authorised HCFC producers and importers in its Official Journal.

Awareness raising
Outreach activities to inform industry, especially small and medium sized enterprises (SMEs), and the general public (consumers of HCFCs), of forthcoming HCFC controls should be carried out. Hotlines could be set up for reporting suspected illegal trade and publicising seizures could to act as a powerful deterrent.

Demand reduction
Use quotas and import taxes or placing on the market fees as part of HCFC phase-out management plans. Revenues collected from taxes/fees should be directed towards financing projects aiming at reducing demand of HCFCs. Establish incentives for introduction of non-HCFC technologies, e.g. diminished customs duties for non-ODS and climate friendly alternatives to HCFCs and relevant products and equipment.

DEFINITION OF KEY TERMS

A2: Article 2 country. The Montreal Protocol uses this term to describe industrialised countries.

A5: Article 5 country. The Montreal Protocol uses this term to describe developing countries.

Black market: Trade in goods in violation of official regulations which are not part of the official economy of a country.

CFC: Chlorofluorocarbons. The original generation of synthetic refrigerants, characterised by very high ODP and GWP.

Feedstock: A raw material to supply or fuel a machine or industrial process. HCFCs are used as feedstocks in various production processes.

Free trade zone: An area within a country where usual trade barriers are reduced. For example tariffs and quotas may be lifted with the intention of attracting business.

Front-door smuggling: Describes situations where there is no effective licensing system and where smugglers may not even attempt to disguise shipments, relying on the fact that the authorities are not paying attention to ODS.

GWP: Global warming potential. GWP is the ratio of warming caused by a substance to the warming caused by a similar mass of carbon dioxide which has a GWP of 1.

HCFC: Hydrochlorofluorocarbon. Introduced as transitionary replacements to CFCs, lower ODPs but high GWP.

HFC: Hydrofluorocarbon. Increasingly popular synthetic refrigerant, no ODP but GWP remains high.

Illegal ODS trade: Importation or exportation of ODS in contravention to national law and licensing and quota systems.

ODP: Ozone depleting potential. ODP is the impact on ozone of a chemical compared to the impact of a similar mass of CFC-11 which has an ODP of 1.

RAC: Refrigeration and Air conditioning.

Smuggler: A person who imports or exports goods in violation of the law, often without payment of legal duty.

Transhipment/transit: Refers to the transfer of a shipment from one carrier, or more commonly, from one vessel to another. Transhipments can be used to hide the identity of the port or country of origin.

APPENDIX 1

REFRIGERANT SEIZURES				
Country	**Date**	**Substance Traded**	**Volume (kg)**	**Exporting Country**
Argentina	2005	HCFC-22	500	China
Cyprus	2005	HCFC-22	680	Israel
Estonia	2005	HCFC	68	Russia
Greece	2007	HCFC	1183	Not provided
Ireland	2007	CFC-12 & HCFC-22	504 & 1306	Not provided
Italy	2007	HCFC-22	35,040	Not provided
Poland	2007	HCFC-22	13.6	Not provided
UK	2007	HCFC-22	153,000	Not provided
Kazakhstan	2007	HCFC-22, 124, 142b	110	Russia
Poland	?	HCFCs	?	Ukraine
Uzbekistan	2003	CFC-12, HCFC-22	?	?
India	2006	HCFC-22	4488	?
India	2007	HCFC-22	4161	?
India	2007	HCFC-22	218	Bangladesh
India	2007	HCFC-22	3210	Nepal
India	2007	HCFC-22	1442	Bangladesh
India	2007	HCFC-22	12730	Bangladesh
US	2008	HCFC-22	163,200	?
US	2009	HCFC-22	418,654	China (suspected)
US	2009	HCFC-22	7616	Mexico
Russia	2008	CFC-112	268,200kg	China
Russia	2009	CFC-12	266,100 kg	China
Armenia	2010	R-502	15 cylinders (204kg)	Iran
Uzbekistan	2010	CFC-12, R-600	50 cylinders CFC-12, 70 cylinders R-600	China
Uzbekistan	2010	R-406, HCFC-22	68 litres in 5 cylinders	India
Uzbekistan	2010	CFC-12, HCFC-22?	36 cylinders, 36kg	China
India	2010	HCFC-22	1,150 13.6kg cylinders	China
India	2010	HCFC-22	1,139 13.6kg cylinders	Middle East
India	2010	HCFC-22	65 large cylinders totalling 55.7MT	Suppliers registered to Singapore and Malaysia

Details	Source
A vessel transported 500 kgs of HFCs from China into Argentina. The customs authorities after testing the substance discovered it to be HCFC-22 which require an import licencse.	data reported by Parties to Montreal Protocol
A delivery of R-408 (47% HCFC-22) had been intercepted during import by the customs. The material was sent by the Israeli supplier by mistake. Actually R-508 (no ODS) was ordered.	data reported by Parties to Montreal Protocol
Illegal export to a Russian ship.	data reported by Parties to Montreal Protocol
R401a in the amount of 1,360 kg (53 per cent R22, 13 per cent R152a, 34 per cent R124) was stopped at the border by customs authorities as the importer was not able to present an import licence.	data reported by Parties to Montreal Protocol
A company was found to be holding stocks of and using CFC-12 and HCFC-22 without allowance. Document checks suggest that the material was illegally imported between 2001 and 2004 from the United Arab Emirates. The substances were found in non-refillable 13.6 kg cylinders. Empty containers were found as well.	data reported by Parties to Montreal Protocol
HCFC-22 in the amount of 35,040 kg was imported in 2006 without an import licence. The case was detected by the European Commission through documentary cross checks.	data reported by Parties to Montreal Protocol
A non-refillable gas cylinder was found on 11 May 2007 during customs control of a passenger car at the Polish-Ukrainian border.	data reported by Parties to Montreal Protocol
A company exported 153,000 kg of HCFC-22 to India for feedstock uses; the company was only licensed to export for refrigeration uses.	data reported by Parties to Montreal Protocol
8 cylinders containing ODS were hidden from customs in a train coming from the Russian Federation	Rodichkin 2008 p.29
Illegal trade has been detected and smugglers fined e.g. HCFCs illegally imported from Ukraine	GEF EO 2009b, s.11
Instances of illegal importation of CFC and HCFC	UNEP 2007a p.26
330 disposable cylinders seized in West Bengal	UNEP 2007a p.26
306 disposable cylinders seized in West Bengal	UNEP 2007b
4 'gunny' bags containing 16 cylinders seized by officer in Lucknow	UNEP 2007b
236 disposable cylinders seized in Lucknow	UNEP 2007b
A mini truck containing 106 cylinders from Bangladesh was seized in Kolkata	UNEP 2007b
936 cylinders seized across Delhi and Mumbai	UNEP 2007b
US customs seized 12,000 cylinders with a market value of USD $1million in Charleston, South Carolina	US EPA
US investigators revealed systematic smuggling by a Florida based firm of 29,107 cylinders between March 2007 to April 2009	US EPA
US customs in Charleston, South Carolina seized 560 cylinders of HCFC-22 refrigerant gas with a domestic value of $97,049	Ozone News
Virgin material imported from China labelled as 'recycled substance'	UNEP ECA Awards 2010
Labelled as 'recycled' suspected illegal import of virgin material	UNEP ECA Awards 2010
Imported via truck. Declared in Customs Entry as R207A (204 kg in total)	UNEP ECA Awards 2010
Smuggled via land border, valued at 1.300.000 Uzbek Sums. Smuggler was fined 113.040 Sums (approximately 75 USD)	
Found at land border in a car. Smuggler order to pay a fine of 188.400 Sums (approximately 125 USD)	UNEP 2010
Found in boot of car at land border crossing. Cylinders were labelled as CFC-12 and HCFC-134a. Smuggler ordered to pay a fine of 37.680 Sums (approximately 25 USD)	UNEP 2010
Detected at Tutincorin Port, cylinders were mis-labelled as R-404a	The Hindo (newspaper)
Seized in Delhi, mis-declared as HFC-134a	UNEP 2010
Seized in Chennai mis-labelled as R-401a	UNEP 2010

EQUIPMENT SEIZURES						
Country	**Date**	**Substance Traded**	**Volume (kg)**	**Exporting Country**	**Details**	**Source**
Kyrgyzstan	2007	CFC-12, HCFC-22	?	South Korea through China	Batch of 27 fridges + 6 showcase refrigerators containing ODS were imported from South Korea through China	Rodichkin 2008 p.33
Czech Rep	2002	HCFC-22	374.4	Not provided	Illegal import of heat pumps containing ODS into the Czech Republic by a company, Polymat, s.r.o. Osvoboditelu 182 767 10 Kromeriz.	data reported by Parties to Montreal Protocol
Czech Rep	2002	HCFC-22	13.6	Czech Rep	Illegal storage and export of air-conditioning units containing ODS.	data reported by Parties to Montreal Protocol
Czech Rep	2003	HCFC-22	NA	Not provided	Illegal import of air-conditioning units containing ODSs to Czech Republic and recovery of ODS without proper permission issued by MoE CR by a company, GEA Klimatizace Vesecka 1 463 12 Liberec.	data reported by Parties to Montreal Protocol
Cyprus	2007	HCFC-22	22	Not provided	A field inspection on 18 June 2007 revealed in a box of 90 air-conditioning units five split units charged with HCFC-22. The first placing on the market of such equipment is illegal in the European Community.	data reported by Parties to Montreal Protocol
France	2005	HCFC-22	Unknown	Not provided	The illegal import of 1,890 air-conditioning units was detected at the customs in Guadeloupe. Material was re-exported.	data reported by Parties to Montreal Protocol
Spain	2005	HCFC-22	Unknown	Not provided	One case of illegal import of equipment with HCFC-22 foam.	data reported by Parties to Montreal Protocol
Uzbekistan	2002	CFC ?	?	?	Several instances of smuggling of refrigerators containing ODS	
Uzbekistan	2007	?	0.0001	China	Compressors for refrigerators and containers of ODS bearing a Chinese trade name were found in a private vehicle	
Uzbekistan	2008	?	1 piece	China	Air-conditioner unit containing ODS produced in China was imported illegally	
Kyrgyzstan	2010	CFC-12	247 units	Germany	Used refrigerators declared as 'humanitarian aid'	UNEP ECA Awards 2010
Uzbekistan	2010	not indicated, suspected CFC	13 refrigerators	China	Smuggler ordered to pay a fine of 376.800 Sums	UNEP 2010
Uzbekistan	2010	HCFC-22		China	2 Air-conditioners containing HCFC-22, 22 freezers, 2 refrigerators containing R-600a were smuggled in a truck via land border. Smuggler ordered to pay a fine of 226.080 Sums (approximately 150 USD)	UNEP 2010

CONTAMINATED MIXTURES

Country	Date	Substance Traded	Volume (kg)	Exporting Country	Details	Source
Philippines	May 03	HCFC-22	2982	China	454 cylinders. Using Neutron refrigerant identifier, the shipment was tested and found to be 30.7% HFC-134a, 9.9% CFC-12, 48.3% HCFC-22, and 11.1% hydrocarbon, instead of pure HFC-134a, as declared. If computed by percentage weight, HCFC-222 amounted to 2982 kilograms.	data reported by Parties to Montreal Protocol
Armenia	May 07	Waste mixture of 15% R-134a mixed with 85% other refrigerants (CFC, HCFC)	1 cylinder mis-labelled as R134A	UAE	Mislabelling of waste mixture as virgin R-134a was detected when testing cylinders during customs training	data reported by Parties to Montreal Protocol
Cyprus	2007	HCFC-22	14	Not provided	During a field inspection on 23 March 2007 160 cylinders marked as containing HFC-134a were found to contain a blend including HCFC-22.	data reported by Parties to Montreal Protocol
Thailand	2005	HCFC-22 & CFC	200 x 13.6 (2720 - not clear what % is HCFC-22)		Seizure of 200 cylinders of HCFC/CFC/HFC blend mislabelled as HFC-134a	Thai Customs
Thailand	May 10	CFC-12, HCFC-22	R-12 / 7,680 kgs R-22 / 768 kgs			Thai Customs
St. Kitts	2006	HCFC-22 & CFC-12	Refrigerant 22 / 768 kgs	St. Maarten free trade zone	When tested by authorities it turned out to be a mixture of R22, R12 and R-134a	ODS tracking study

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66. Source UNEP Ozone Secretariat Article 7 data reporting (ODP data). Conversion factor from ODPT to MT is assumed to be 1
67. Source UNEP Ozone Secretariat Article 7 data reporting (ODP data). Conversion factor from ODPT to MT is assumed to be 15.35, using same conversion factor applied in Table 2.1 of EIA and Chatham House (2006) ODS Tracking: Feasibility study on developing a system for monitoring the transboundary movement of controlled ozone-depleting substances between the Parties
68. UNEP (2001) OzonAction Newsletter Special Supplement, Number 6, Article "The Tricks of Illegal Trade: How criminals smuggled ODS" authored by EIA
69. Except for products and equipment containing or relying on halon for critical uses and for products and equipment containing HCFCs subject to an individual derogation and notification to the destination country
70. TEAP (2007) "Response to Decision XVIII/12: Report of the Task Force on HCFC issues (with particular focus on the impact of the clean development mechanism) and Emissions Reduction Benefits Arising from Earlier HCFC Phase-out and Other Practical Measures"
71. Ibid
72. UNEP (2008) "Further elaboration and analysis of issues pertaining to the phase-out of the HCFC production sector (Decision53/37(q)" UNEP/OzL.Pro/ExCom/55/45 Source cited in document: Sherry Consulting.
73. UNEP/OzL.Pro/ExCom/57/61
74. HPMPs are divided up into stages to enable developing countries to plan for each phase-down step. Stage one takes into account the freeze and first 10% reduction in 2015, Stage two runs from 2015-2020, Stage three from 2020-2025, and Stage four covers 2025 and beyond

About the UNEP Division of Technology, Industry and Economics

The UNEP Division of Technology, Industry and Economics (DTIE) helps governments, local authorities and decision-makers in business and industry to develop and implement policies and practices focusing on sustainable development.

The Division works to promote:

> sustainable consumption and production
> the efficient use of renewable energy
> adequate management of chemicals
> the integration of environmental costs in development policies.

The Office of the Director, located in Paris, coordinates activities through:

> The International Environmental Technology Centre - IETC (Osaka), which implements integrated waste, water and disaster management programmes, focusing in particular on Asia.
> Sustainable Consumption and Production (Paris), which promotes sustainable consumption and production patterns as a contribution to human development through global markets.
> Chemicals (Geneva), which catalyses global actions to bring about the sound management of chemicals and the improvement of chemical safety worldwide.
> Energy (Paris and Nairobi), which fosters energy and transport policies for sustainable development and encourages investment in renewable energy and energy efficiency.
> OzonAction (Paris), which supports the phase-out of ozone depleting substances in developing countries and countries with economies in transition to ensure implementation of the Montreal Protocol.
> Economics and Trade (Geneva), which helps countries to integrate environmental considerations into economic and trade policies, and works with the finance sector to incorporate sustainable development policies.

UNEP DTIE activities focus on raising awareness, improving the transfer of knowledge and information, fostering technological cooperation and partnerships and implementing international conventions and agreements.

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Despite significant progress in tackling illegal trade in ozone depleting substances over the past decade there is thought to be a significant threat in the near future of a dramatic increase in illegal trade in hydrochlorofluorocarbons (HCFCs). There is, in general, a lack of awareness about the issue of illegal trade in HCFCs and the potential impact this may have on the HCFC phase-out.

This report provides a summary of recent cases of illegal trade and the policy measures in place to combat HCFC smuggling. By considering market conditions for HCFCs and drawing parallels with the context and methods used by smugglers which led to chlorofluorocarbon (CFC) smuggling, the report provides an analysis of the risks of HCFC smuggling becoming entrenched and makes recommendations on how this illegal trade can be prevented.

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