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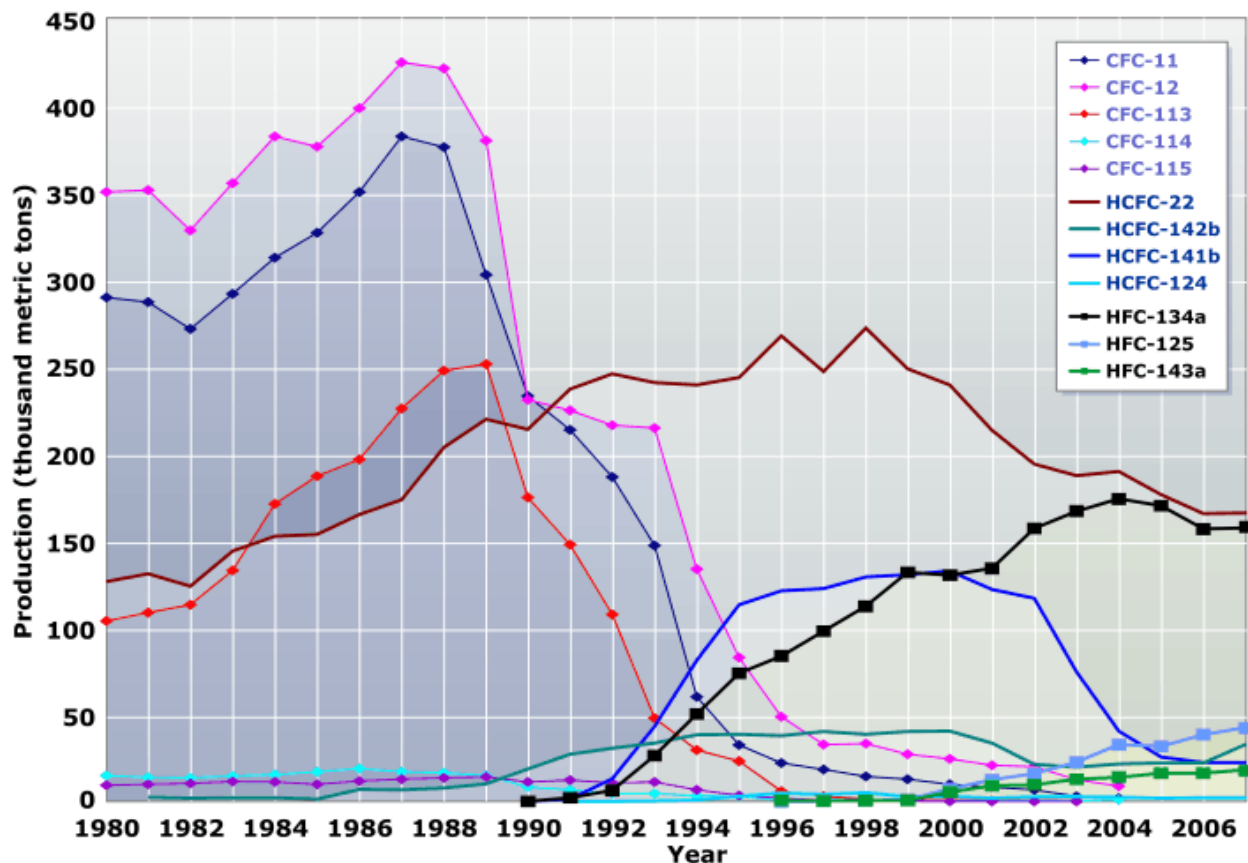
An update on fluorocarbons and sulfur hexafluoride

ISSUE 73 – December 2009 - January 2010

PRODUCTION AND SALES OF FLUOROCARBONS FOR 2007

AFEAS has published the [2007 production and sales](#) of Fluorocarbons from responding companies. Data are available through 2007 for [HCFCs](#) 22, 124, 141b and 142b and [HFCs](#) 134a, 125 and 143a.

Annual Production of Fluorocarbons Reported to AFEAS (1980-2007)



They do not include production in Russia, Korea, India and China.

All of the production and sales data through 2007 are available for download at the AFEAS [Data Download Page](#).

Fluorocarbon alternatives initially grew rapidly after their introduction to replace CFCs but now have varied growth rates, with most levelling off as they become more



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mature products. Production of HCFCs reported to AFEAS has fallen significantly since 1996. The increase in total HFC production has been modest compared to the decline in CFCs and HCFCs.

However, the production of HCFCs and HFCs reported to AFEAS has now shrunk to about half of the global total and will fall further. This means that the data no longer have scientific value as indicators of global production (and hence as a source of estimates of global emissions) and their [collection will now cease](#).

AFEAS ANNOUNCES THE HCFC AND HFC DATA COLLECTION WILL STOP

The production of HCFCs and HFCs reported to [AFEAS](#) has now shrunk to about half of the global total and will fall further.

Production of HCFCs and HFCs that is not reported to AFEAS, principally in India and China, is estimated now to be about 310,000 tonnes/year and growing at a rate of 15%/year (1).

This means that the data no longer have scientific value as indicators of global production (and hence as a source of estimates of global emissions) and their collection will now cease.

Because the quantities of all CFCs had become so small, CFC production after 2004 was already [no longer reported](#).

Background

Since 1976, the chemical industry has voluntarily reported the production and sales of fluorocarbons through a survey compiled by independent auditors. The main purpose of the survey was to provide the scientific community with data estimating the atmospheric release of fluorocarbons.

The companies surveyed include subsidiaries and joint ventures that have or had CFC, HCFC or HFC production in the following countries: Argentina, Australia, Brazil, Canada, European Union, Japan, Mexico, United States and Venezuela.

Production of CFCs by the responding companies has continued to diminish in both absolute and relative terms to the point where, in 2004, CFC data reported to AFEAS amounted to only 16% of the global total (estimated from the database maintained by [UNEP](#)), and the collection of CFC data ceased.

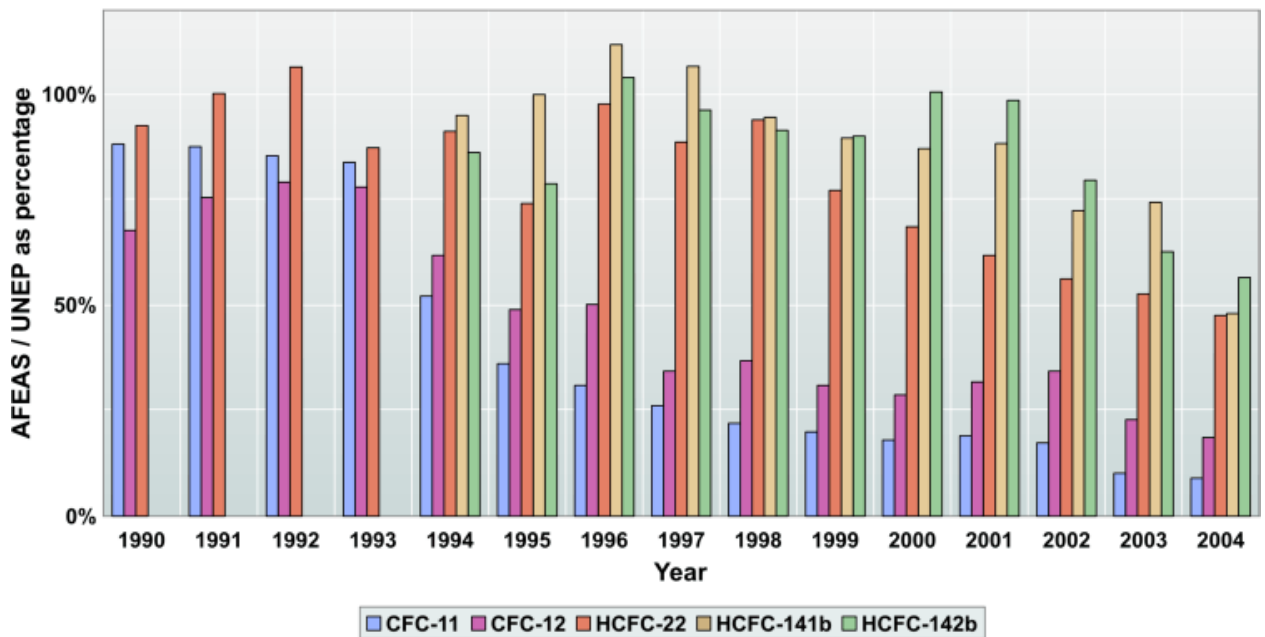
Since 2004, the 15%/year growth in the rate of production of HCFCs in countries where manufacturers do not report to AFEAS means that the trend for HCFCs has

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continued almost linearly (so that the production represented by the AFEAS data is about 20 to 30% of the global total).

The following graph illustrates the coverage of AFEAS data relative to the production and consumption reported by UNEP (2) for CFCs 11 and 12 and HCFCs 22, 141b and 142b. Values greater than 100% occurred when the UNEP data (which are gathered from national submissions, unaudited) failed to reach the total reported to the AFEAS auditors.

Ratio of the production reported to AFEAS to the "global" production reported by UNEP



As for HFCs, they are now being made in significant quantities by Chinese manufacturers that do not report to AFEAS (production capacity there is estimated to be 75,000 tonnes/year for HFC-134a alone).

- (1) Based on information in: Will R., Global Fluorspar Supply and Demand Trends, SRI Consulting, Industrial Minerals FO7 Conference, Frankfurt, 5-7 Nov 2007.
- (2) Source: Task Force on Emissions Discrepancies Report, UNEP Technology and Economic Assessment Panel, October 2006.



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UNEP REPORT: NO EVIDENCE THAT TRIFLUOROACETIC ACID WILL HAVE ADVERSE EFFECTS ON HUMANS OR THE ENVIRONMENT

According to the [2009 Progress Report](#) of the UNEP Environmental Effects Assessment Panel, presented at the 21st Meeting of the Parties to the Montreal Protocol in November 2008, there is no new evidence to suggest that trifluoroacetic acid (TFA), a breakdown product of HCFCs and HFCs, will have adverse effects on humans or the environment, given the small projected deposition of the substance in oceans.

Several HCFCs or HFCs can break down into TFA in the environment, which eventually ends in oceans and in lake waters. As TFA is very stable and very water soluble, it accumulates in the oceans where concentrations, largely from natural sources, are around 200 ng/L.

Compared to this value, TFA derived from a worst-case estimate of release of TFA from complete conversion of HFCs and HCFCs would result in an increase in concentration of TFA in the oceans by about 0.016 ng/L, a negligible increase above the background concentration.

Regarding the health impact of TFA, the Report notes that no adverse effects of TFA in mammals or humans were revealed in a recent search of the literatures, largely because concentrations causing measurable effects in organisms in the environment are large (222,000 to 10,000,000 ng/L) and thus provide a more than 1000-fold margin of safety for worst-case scenarios.

HFC-134a THE BEST AVAILABLE REFRIGERANT FOR VENDING MACHINES – ACCORDING TO THE EU VENDING MACHINES ASSOCIATIONS

The European Vending Association ([EVA](#)) recommends great caution when considering measures on R-134a and vending machines. They are considering all Best Available Technologies but for the moment need R-134a, because they currently don't have any serious and marketable alternatives.

To EVA's knowledge, there is no vending machine in Europe operating with CO₂ or other alternative refrigerants, beside some tests, and that in Japan, where machines are different, more than 90 % of the machines are still using HFC-134a.

The vending industry is happy to quickly apply any alternative that would be available on the market, as long as it is safe, economically and environmentally viable.



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EVA manufacturers members have been trying to introduce alternative gases in the machines. So far, there has been limited success:

- Hydrocarbons are flammable and present therefore safety and technical limitations;
- CO₂ presents cost and energy efficiency disadvantages.

In the present situation, the refrigerant charge is small, is contained in hermetically sealed systems, and at end of life machines are dealt with by professional scrapping companies which deal with the gas in special degassing points.

There are around 4 million vending machines in Europe - of which 100% use HFC-134a -run by some 10,000 companies, mostly SMEs and family businesses.

The European Vending Association ([EVA](#)) represents the whole of the vending industry: machine and component manufacturers, suppliers of commodities and operators (companies, mostly SMEs, managing the machines on a daily basis).

Source: "Position of the European Vending Association on the HFC gas R-134a"

AREA CALLING FOR PREVENTION OF ILLEGAL IMPORT OF HCFCs INTO THE EU

[AREA](#) (the European association representing refrigeration, air conditioning and heat pump contractors) calls on European Union Member State to take the necessary steps to prevent illegal imports of [HCFCs](#) into the EU.

Indeed, in line with EU [Regulation \(EC\) 1005/2009](#) (1), as of 1st January 2010, the use of HCFCs will be banned in the European Union, with the exception of reclaimed and recovered HCFCs when servicing equipment.

However, HCFCs are still used in a wide variety of applications, including process chilling, food storage and air conditioning, and the amount of recovered HCFCs is only a small fraction of the amount of HCFCs currently used for service and maintenance of air conditioning and refrigeration equipment.

This may lead to the creation of an illegal market for the importation of HCFCs from outside the EU, as previously happened with the phase-out of CFCs.

Concern has been expressed by AREA members across the EU that the benefit to the environment anticipated by the phase-out of virgin HCFCs will be negated and that competition will be distorted by illegal imports.

(1) Replacing Regulation (EC) [No 2037/2000](#), as of 1st January 2010

Source : <http://www.area-eur.be/Rainbow/Documents/AREA%20letter%20HCFCs.pdf>



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HFC REFRIGERANT FOR GENERATING ELECTRICITY FROM SOLAR HEAT

HFC-245fa is used in an [Organic Rankine Cycle \(ORC\)](#) technology to supply both power and heat from a single solar heat source plant.

Conventional photovoltaic plants provide power, and solar panels only heat. With the new technology in a unique design water heated by solar panels is used to evaporate HFC-245fa, which in turn drives a turbine to generate electricity, while the remaining heat from expanded HFC-245fa can be used to supply heating and hot water. No fuel is burned to create the electricity, and the unit does not produce any carbon dioxide emissions

HFC-245fa refrigerant is being used because of its stability, non-flammability, low toxicity and convenient low boiling point, making it ideal for use in ORC systems that use low-temperature heat and waste heat to generate electricity.

The technology is used for systems having a small electrical power output of 3.5kW, suited to the needs of homeowners, but the company can offer the ORC technology in sizes up to 500KW to meet the needs of differing heat recovery opportunities.

Sources: Equipment and Product manufacturers

See also: ["HFC USED TO CONVERT LOWER TEMPERATURE WASTE HEAT INTO POWER"](#)

UK REFRIGERATION AND AIR CONDITIONING INDUSTRY CALLING FOR RECOGNITION OF SYSTEM EFFICIENCY IN FUTURE HFC POLICIES

Discussions are continuing about a [phase down of HFC use](#) but [ACRIB](#), the British Air conditioning and Refrigeration Industry Board, insists that an HFC phase down, as envisaged in future HFC policies, must not be allowed to compromise systems energy efficiency.

Supporting the need to curb direct emissions from the use of HFC refrigerants by the effective implementation of the F Gas Regulation, ACRIB stresses that in order to reduce CO₂ emissions, future policies must take into account both direct (through leakage) and indirect emissions (through energy use).

Focusing only on the GWP of a single refrigerant could lead to system design decisions which compromise system efficiency – and therefore contribute to



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increased CO₂ emissions in the long term. For the same reasons, the option of choosing the most appropriate refrigerant for a specific application should be retained

Legislation to reduce emissions in the most appropriate and effective manner should of course take into account the performance and availability of new lower GWP refrigerants and systems using low or zero GWP refrigerants.

Source: [ACRIB issues statement on future HFC policies](#) - 10/11/2009

NEW ON FLUOROCARBONS.ORG

Regulatory developments

A new section "**Copenhagen Corner**" has been created, containing:

- [Key Issues](#)
- [EFCTC Position](#)

Factsheets

Updated in 2009:

[FS nr 2](#) -The Ozone Layer

[FS nr 5](#) - Potential Effect of Climate Change on Stratospheric Ozone Depletion

[FS nr 6](#) - The Effect of Ozone Depletion in the Stratosphere over Populated Regions of the Northern Hemisphere

Safety, Health and Environment > Health

[Cardiac sensitization report:](#)

Library

[Handbook for the Montreal Protocol on Substances that Deplete the Ozone Layer Eighth edition](#) (2009)



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NEW ON WWW.FIGAROO.ORG



Tools section

- Call for an INTERNSHIP - REFRIGERANTS LOGBOOK EVALUATION PROJECT

The goal of the project is to evaluate the logbook model in all respects with a view to develop an improved version.

- HCFC requirements according to the recast EU Ozone Regulation 1005/2009

NEW LINKS ADDED

EVA - European Vending Association representing European vending industry

<http://www.vending-europe.eu/eva/home.html>