



Distr.: General  
30 September 2014

English only



**United Nations  
Environment  
Programme**

**Twenty-Sixth Meeting of the Parties to  
the Montreal Protocol on Substances that  
Deplete the Ozone Layer**

Paris, 17–21 November 2014

Item 4 (f) (ii) of the provisional agenda\*

**Montreal Protocol issues: issues related to  
alternatives to ozone-depleting substances:  
information submitted by parties on their  
implementation of paragraph 9 of decision XIX/6  
to promote a transition from ozone-depleting  
substances that minimizes environmental impact  
(decision XXV/5, paragraph 3)**

**Submissions by parties on the implementation of decision XIX/6**

**Note by the Secretariat**

1. In paragraph 3 of its decision XXV/5, the Meeting of the Parties encouraged parties to provide to the Secretariat, on a voluntary basis, information on their implementation of paragraph 9 of decision XIX/6, including information on available data, policies and initiatives pertaining to the promotion of a transition from ozone-depleting substances that minimize environmental impact wherever the required technologies are available, and requested the Secretariat to compile any submissions received for consideration by the Open-ended Working Group at its thirty-fourth meeting.
2. In response to the decision, 14 parties submitted information on their implementation of paragraph 9 of decision XIX/6 prior to the thirty-fourth meeting of the Open-ended Working Group in July 2014. That information was presented in documents UNEP/OzL.Pro.WG.1/34/INF/4, UNEP/OzL.Pro.WG.1/34/INF/4/Add.1 and UNEP/OzL.Pro.WG.1/34/INF/4/Add.2.
3. Since the thirty-fourth meeting of the Open-ended Working Group, the Secretariat has received relevant new or additional information from six parties: Belgium, Japan, the Netherlands, Switzerland, the United States of America and the European Union. The information submitted by the European Union includes submissions by five of its member States (Denmark, Ireland, Poland, Slovenia and Spain) and refers to legislation applicable to all 28 of its member States.
4. The information submitted by the six parties mentioned above is contained in the annex to the present note and is presented as received by the Secretariat, without formal editing.

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\* UNEP/OzL.Conv.10/1-UNEP/OzL.Pro.26/1.

## Annex

### Compilation of submissions by parties on the implementation of decision XIX/6

#### Belgium (Flemish region)

The ecology premium in Flanders: The ecology premium is a financial compensation for companies that will invest in ecology in the Flemish Region. Ecology investments can be interpreted as environmental investments and investments as far as energy is concerned. With the ecology premium, the Flemish Government aims to stimulate companies' production process in order to make it more environmental friendly and more energy-saving. The Flemish Government accounts for a part of the extra investment costs, which is normal for such an investment. A financial compensation can be received when enterprises choose to replace HFCs by natural refrigerants (for existing and new installations). The subsidy is calculated as a percentage on the extra cost with which the enterprise is confronted with when choosing HFC-free technologies.

#### European Union

Information provided by the European Commission pertaining to the promotion of a transition from ozone-depleting substances that minimize environmental impact wherever the required technologies are available:

- Denmark: Restrictions and Taxes on Fluorinated Gases<sup>1</sup>
- Ireland: Guidance for Operators and Contractors:

[http://www.epa.ie/air/airenforcement/ozone/guidanceanddownloads/#.U9I\\_y\\_ldUwp](http://www.epa.ie/air/airenforcement/ozone/guidanceanddownloads/#.U9I_y_ldUwp)

- Slovenia: Tax on Fluorinated Gases

*Government of the Republic of Slovenia (2013), 1853rd Decree on environmental tax on air pollution caused by emissions of carbon dioxide, Official Gazette of the Government of the Republic of Slovenia, no. 47/2013 of 31 May 2013*

- Spanish Tax on Fluorinated Gases<sup>2</sup>
- Polish: Mandatory Fees on Fluorinated Gases

*CFCs - ca. 44 Euro/kg  
HCFCs - ca. 12 Euro/kg  
HFCs - ca. 7 Euro/kg*

- Pertinent EU legislation:

- Fgas Regulation - Regulation (EU) No 517/2014:  
[http://ec.europa.eu/clima/policies/f-gas/legislation/index\\_en.htm](http://ec.europa.eu/clima/policies/f-gas/legislation/index_en.htm)

*Phase-down, Restrictions of Use and Obligations of Refrigerant Management/Containment*

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<sup>1</sup> See submission by Denmark

<sup>2</sup> Regulation and Act on F-gasses in Spanish (*not translated and therefore not included in this Annex*)

- Mobile Air Conditioning (MAC) Directive -, Directive 2006/40/EC:  
<http://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX:32006L0040>  
*Restriction of car AC refrigerant to GWP<150*
- EU Effort Sharing Decision - Decision No 406/2009/EC:  
<http://ec.europa.eu/clima/policies/effort/documentation>  
*EU Member States can include HFCs in their efforts to reduce greenhouse gas emissions*
- Ecodesign of Air conditioners - Regulation (ED) No 206/2012:  
<http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32012R0206&from=en>  
*Bonus for low GWP refrigerants*
- Directive on waste electrical and electronic equipment (WEEE) – Directive 2012/19/ED:  
<http://eur-lex.europa.eu/legal-content/EN/TX/1/?uri=CELEX:32002L0096>  
*Separate collection/Take back systems of equipment containing ODS and fluorinated greenhouse gases*
- European Management and Audit System (EMAS) - Regulation (EC) No 1221/2009:  
[http://ec.europa.eu/environment/emas/documents/guidance\\_en.htm](http://ec.europa.eu/environment/emas/documents/guidance_en.htm)  
*Voluntary management system for companies where HFC emissions, waste etc. are addressed*
- EU Green Public Procurement (GPP) criteria for Electrical and Electronic Equipment used in the Health Care Sector:  
[http://ec.europa.eu/environment/gpp/eu\\_gpp\\_criteria\\_en.htm](http://ec.europa.eu/environment/gpp/eu_gpp_criteria_en.htm)  
*Medical freezers with refrigerants of GWP<10 are awarded points*

## **Denmark**

### **The use of F-gases has been halved!**

*The Danish regulation has led to a decline in the consumption of F-gases. The most important substances are the HFC substances and the import of bulk HFC substances has almost been halved from around 700 tonnes/year in 2001/2002 to around 360 tonnes in 2009.*

In 2001 and 2002, Denmark introduced national regulation on F-gases. The aim was to reduce the consumption and emission of F-gases and the Danish Parliament (Folketinget) agreed on a number of instruments. They comprised a ban on the use of F-gases for certain purposes, F-gas taxation and support for research and development of alternative technology.

In Denmark, taxation was implemented in 2001 and a ban on certain applications was introduced in 2002.

### **A short description of the tax/refund scheme**

The main principle was that a tax of DKK 100 (app. 13 Euro) per tonne of CO<sub>2</sub> equivalent was imposed on the importation of HFC/PFC/SF<sub>6</sub>. That figure was increased by 50 % from January 2011 to DKK 150 (app. 20 Euro) per tonne of CO<sub>2</sub> equivalent. That means that a tax amounting to DKK 195 (app. 26 Euro) per kilogram is now imposed on the most frequently used F-gas refrigerant (HFC-134a).

In practice, the system is implemented by taxation on all gas in bulk and on imported products. The tax is administrated by the Danish Customs and Tax Administration, which is an organisation under the Danish Ministry of Taxation.

Information from the market indicates that the tax/refund scheme has led to more awareness from owners as well as operators of the equipment. The tax has also increased the attention on alternative substances (HCs, CO<sub>2</sub>, ammonia or other substances or techniques) and has resulted in improved housekeeping of reused gas.

Teething troubles were solved through a good cooperation between the industry and ministries and since then the administration of the system has worked satisfactorily.

### **A short description of the ban**

In the Danish Statutory Order, no. 552, on regulation of certain industrial greenhouse gases from 2002 there is a general ban on new products containing or using F-gases from 1 January 2006.

There are some exemptions from this general ban. For instance, the use of HFCs in refrigeration systems is still allowed for cooling equipment with HFC charges between 0.15 kg to 10 kg and the use of HFC for service purposes is exempt from the Statutory Order.

The export of HFC containing products is also exempt from the ban.

### **Support for alternatives**

When the regulation had been approved it was decided to support R&D projects to ensure a quick development of alternative technology. The Danish Environmental Protection Agency (EPA) conducted the scheme and a number of projects in the refrigeration area were supported financially with app. DKK 20 million. In addition, the "HFC free Centre" was established by the Danish EPA. The Centre offers consultancy services that are free of charge (up to 5 hours of engineering consultancy) for the refrigeration industry and installers to help them implement alternative technology.

Simultaneously, the education capacity for installers was increased, and hundreds of refrigeration technicians have now been educated to handle refrigeration systems with CO<sub>2</sub>, hydrocarbons and ammonia.

### **Implementation of alternative technology**

In this section, some examples are given of the extent of alternative refrigeration technology in Denmark.

#### *Supermarkets:*

A number of different centralized refrigeration systems using CO<sub>2</sub> refrigerant were built and tested in supermarkets in Denmark. Soon it appeared that the transcritical systems were well-suited for conditions in Danish supermarkets and today the technology is standard technology and hundreds of systems are installed showing good performance, energy efficiency and economy. There is also considerable export of CO<sub>2</sub> equipment to installers in other countries.

#### *Commercial plug-in cabinets:*

Commercial, refrigerated cabinets using hydrocarbon refrigerants were developed and tested in the past decade. New components (including compressors) were developed and marketed and the technology appeared to be more energy efficient compared to similar HFC refrigeration technology. Today, hydrocarbon technology is standard in bottle coolers, food service cabinets, ice cream freezers, etc. Several international food and beverage companies use professional refrigerators with hydrocarbon technology.

#### *Industrial refrigeration systems:*

In Denmark, ammonia has been used for industrial refrigeration for more than 100 years. Today, only very small industrial refrigeration systems are built with F-gases (< 10 kg HFC).

#### *Chillers for air-conditioning and the process industry:*

Ammonia chillers have been produced in Denmark for at least 30 years. In addition, two manufacturers

have developed and marketed hydrocarbon chillers during the past decade. The ammonia chillers are very efficient and competitive for high-cooling capacity, and the hydrocarbon chillers are very efficient and competitive in the medium to small range. Only very small chillers with F-gases are installed in Denmark (< 10 kg HFC).

Very recently, there are at DTI, together with Japanese companies developed a commercially competitive chiller with water as refrigerant which is expected to be introduced to the market in about 3 years by Kobelco and Johnson Controls. The chiller is at least as energy efficient as the very best HFC chillers and 10 to 20% better than typical existing installations. Demonstration of the technology will be established shortly.

#### *Domestic refrigerators and freezers:*

The introduction of the regulation very soon resulted in an almost 100 % penetration of hydrocarbon technology for domestic refrigerators and freezers, for domestically produced as well as imported appliances.

### **Decline in consumption and emissions**

The Danish regulation has led to a decline in the consumption of F-gases. The most important substances are the HFC substances and the import of bulk HFC substances has almost been halved from around 700 tonnes/year in 2001/2002 to around 360 tonnes in 2009 (see figure xxx, next page).

There is a delay in the impact for emission of F-gases as most of the consumed bulks are filled into refrigeration systems with certain leakage rates. But in 2009, the Danish emission of F-gases declined from 895,000 tonnes CO<sub>2</sub> equivalents in 2008 to 848,000 tonnes CO<sub>2</sub> equivalents in 2009.

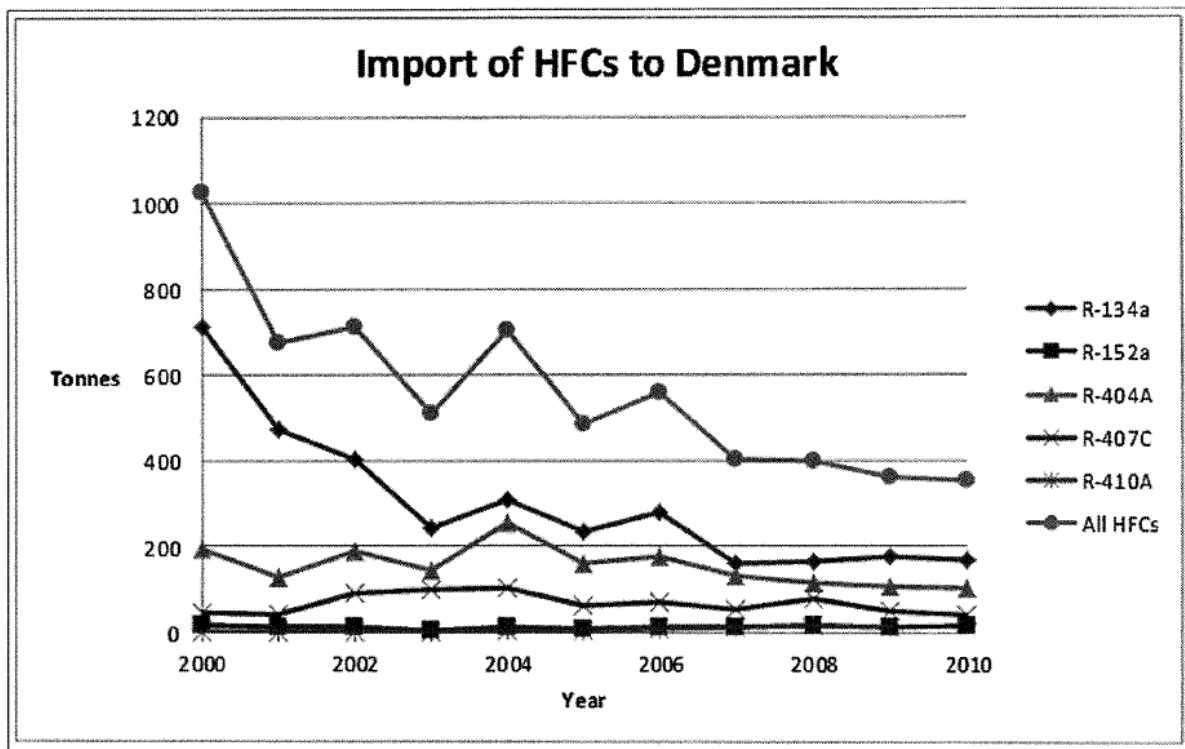


Figure: Import of HFC bulk to Denmark 2001 – 2010. Source: "The greenhouse gases HFCs, PFCs and SF<sub>6</sub>. Danish consumption and emissions, 2009", Environmental project, Danish Environmental Protection Agency, 2010. Updated in 2012.

**MINISTRY OF THE ENVIRONMENT**  
**DANISH ENVIRONMENTAL PROTECTION AGENCY**  
 Translation LK  
 August 2002

### Statutory Order no. 552 of 2 July 2002 Regulating Certain Industrial Greenhouse Gases<sup>1</sup>

In pursuance of sections 30, 45(1), 59(4), and 60 of Act on Chemical Substances and Products, cf. Consolidated Act no. 21 of January 16, 1996, as last amended by Act no. 424 of June 10, 1997, and Act no. 256 of April 12, 2000, the following provisions are laid down:

#### **PART 1**

##### *Scope*

1.-(1) This Order applies to hydrofluorocarbons (HFC's), perfluorocarbons (PFC's) and sulphurhexafluoride (SF<sub>6</sub>).

#### **PART 2**

##### *Restrictions on Use etc.*

2.-(1) Import, sale and use of new products containing the specified greenhouse gases are prohibited after January 1, 2006.

(2) Irrespective of the date specified in subsection (1), import, sale and use of new products listed in Annex 1 and containing the greenhouse gases specified above, are prohibited after the dates set out in the Annex.

3.-(1) Import, sale and use of the specified greenhouse gases - new and recovered - are prohibited after January 1, 2006.

(2) Irrespective of the date specified in subsection (1), import, sale and use of the applications set out in Annex 2, are banned after the dates specified in the Annex.

(3) Industrial use of the specified greenhouse gases is not covered by this Order except the industrial uses specified in Annex 2. Industrial use is defined as use of the specified gas in the production of a product in which the greenhouse gas is not present in the final product.

### **PART 3**

#### *Administrative provisions*

4.-(1) Supervision and control of compliance with the rules of this Order are in the hands of the Danish EPA, cf. Part 10 of Act on Chemical Substances and Products.

(2) The Danish EPA may in special cases allow derogations from the rules of this Order.

(3) Decisions made by the Danish EPA under subsection (2) cannot be appealed to other administrative authorities.

### **PART 4**

#### *Penalty and entry into force*

5.-(1) Unless more severe penalty is due under other legislation, anyone violating sections 2 and 3 of this Order is liable to a penalty of fine.

(2) Where the violation was committed deliberately or by gross negligence, and where the violation resulted in achieved or intended economic profits, including savings, for the offender or for others, penalty may increase to detention or imprisonment for up to two years.

(3) Criminal liability may be imposed on corporations etc. (legal persons) according to the rules of Part 5 of the Danish Criminal Code.

6.-(1) This Order enters into force on July 15, 2002 and will automatically be revoked on January 1 2011 unless otherwise decided before this date, cf. letter from the Ministry of Justice of February 28, 2002, on a trial scheme covering the use of automatic expiry clauses in certain Statutory Orders regulating the environment and the working environment.

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<sup>1</sup>This draft Order has been notified in accordance with the European Parliament and Council Directive 98/34/EC (Information Procedure Directive) as amended by Directive 98/44/EC.

**Irrespective of the ban in section 2, the dates below shall apply to the listed new products containing the specified substances:**

<b>Product</b>	<b>Substance</b>	<b>Date of ban</b>
District heating pipes	All	September 1, 2002
Jointing foam	All	September 1, 2002
Spray cans	All	September 1, 2002
Car tyres	SF <sub>6</sub>	September 1, 2002
All products	PFC's	September 1, 2002
Panes of glass	SF <sub>6</sub>	January 1, 2003
Shoes (sale allowed until January 1, 2004)	SF <sub>6</sub>	July 1, 2003
Cooling plants, heat pumps, air conditioning plants (comfort cooling) and dehumidifiers with charges with or above 10 kg	HFC's	January 1, 2007
High voltage plants (voltage > 1 kV)	SF <sub>6</sub>	Exempted
Cooling plants, heat pumps, air conditioning systems (comfort cooling) and dehumidifiers with charges between 0,15 kg and 10 kg	HFC's	Exempted
Cooling systems for heat recovery, primarily connected by welding or brazing in a factory assembled compact cabinet and with a charge of or less than 50 kg	HFC's	Exempted
Vaccine coolers	HFC's	Exempted
Mobile cooling plants	HFC's	Exempted
Air conditioning in vehicles and planes	HFC's	Exempted
Low temperature freezers (Temperature below -50 °C)	HFC's	Exempted
Medical spray cans	HFC's	Exempted
Laboratory equipment	All	Exempted
Facilities for testing of cooling equipment	HFC's	Exempted
Thermostats, valves etc.	All	Exempted
Products for military use	All	Exempted
Products for use on ships	All	Exempted

## ANNEX 2

**Irrespective of the ban in section 3, the following dates shall apply to the following applications of the substances below:**

<b>Application</b>	<b>Substance</b>	<b>Date of ban</b>
Tracer gas	SF <sub>6</sub>	September 1, 2002
Shielding gas in light metal foundries	SF <sub>6</sub>	September 1, 2002
Refrigerant mixtures in which PFC's constitute less than 10 % of the mixture	PFC's	January 1, 2006
Production of flexible polyurethane foam	HFC's	January 1, 2006
Servicing of cooling plants, air conditioning systems, heat pumps, dehumidifiers	HFC's	Exempted
Servicing of air conditioning in vehicles and planes	HFC's	Exempted
Servicing of high voltage plants (voltage > 1 kV)	SF <sub>6</sub>	Exempted
Servicing of laboratory equipment	All	Exempted
Military use	All	Exempted
Use on ships	All	Exempted



## Japan

### **Additional information pursuant to Decision XXV/5, paragraph 3 on the implementation of paragraph 9 of decision XIX/6**

Japan's new measures to manage HFCs and promote low-GWP alternatives

- Amendment of the "Act Concerning the Recovery and Destruction of Fluorocarbons" -

#### **Background (current status)**

- CFCs/HCFCs have been successfully reduced significantly.
- HFCs emissions have been increasing rapidly and are expected to double in 2020 as compared to emissions in 2011.
- Under the current law, which requires the recovery of CFCs/HCFCs/HFCs from end-of-life commercial refrigerators and air-conditioners, the recovery ratio remains low (about 30%).
- The amount of refrigerant leakage from equipment in use is increasing more than expected.
- The global trend of F-gas management is to strengthen regulations.

On 5 June 2013, the Diet of Japan passed a bill to amend the "Act Concerning the Recovery and Destruction of Fluorocarbons". The amended act shall come into force on 1 April 2015 as the "Act on Rational Use and Proper Management of Fluorocarbons".

In addition to the existing requirement under the current law of the recovery and destruction of CFCs/HCFCs/HFCs from commercial refrigerators and air-conditioners at the time of maintenance and disposal by registered collectors and approved destructors, the government of Japan shall introduce new policy measures as follows in order to strengthen F-gas regulation in Japan.

#### **New Measure 1: Promotion of low-GWP/non-fluorocarbons for designated products**

Manufacturers and importers of the designated products will be required to replace high-GWP products with products using low-GWP or non-fluorocarbon alternatives in order to reduce climate impact. The target GWP value is set based on the lowest GWP (weighted average by volume) among the designated products in the market in Japan and also in consideration of safety, energy efficiency, affordability, etc.

#### **New Measure 2: HFCs phase-down**

Producers and importers of fluorocarbon gases will be required to develop plans to phase down HFCs through the development and production of alternative gases of lower GWP also in consideration of safety, energy efficiency, affordability, etc.

Table 1. Target GWP value and target year by category of designated products

Designated products *	Refrigerant currently in use (GWP)	Target value (GWP)	Target year
Room air-conditioning	HFC-410A (2090) HFC-32 (675)	750	2018
Commercial air-conditioning (for offices and stores)	HFC-410A (2090)	750	2020
Condensing unit and refrigerating unit (for separate type showcases etc.)	HFC-404A (3920) HFC-410A (2090) HFC-407C (1774) CO2 (1)	1500	2025
Cold storage warehouse (for more than 50,000 m <sup>3</sup> )	HFC-404A (3920) Ammonia (lower than 10)	100	2019
Mobile air-conditioning	R134a (1430)	150	2023
Urethane foam (house building materials)	HFC-245fa (1030) HFC-365mfc (795)	100	2020
Dust blowers	HFC-134a (1430) HFC-152a (124) CO2 (1), DME (1)	10	2019

\* Exceptions may be accepted.

The designated products are determined based on the availability of technically proven products and in consideration of other factors including safety in use at this time. Other types of product will be added to the designated products, depending on the availability of alternatives.

**New Measure 3: Reduction of refrigerant leakage from equipment in use (by ensuring periodical leakage check, repair before recharging, etc.)**

Users will be required to conduct periodical check of refrigerant leakage (refer to Table 2 for the outline), to call service engineers to undertake repair before recharging as soon as leakage is found, and to keep records of maintenance, so that maintenance operators etc. can refer to them, as necessary. When leakage and/or equipment failure is found, refilling the equipment with the refrigerant is prohibited in principle until the confirmation of no leakage is made.

Information such as the type/amount of refrigerant used and details of maintenance practices including periodical check and repair must be recorded.

Users will be required to report the amount of refrigerant leakage to the government, if the amount of leakage exceeds 1,000 CO<sub>2</sub>-tonne/year. The amount of leakage is calculated as follows:

The amount of refrigerant leakage (CO<sub>2</sub>-t) =

$$\sum_i \{ (\text{The amount of refrigerant}_i \text{ charged to refill the equipment (kg)} - \text{The amount of refrigerant}_i \text{ recovered (kg)}) \times \text{GWP of refrigerant}_i \} / 1000$$

\* The amount of charged and recovered refrigerants must be certified in writing by registered operators.

Table 2. Periodical check of refrigerant leakage (outline)

	Method		Minimum frequency	Qualification
Simplified periodical check (intended for all types of commercial RAC equipment)	[Air conditioners] ✓ Watching for symptoms of refrigerant leakage such as abnormal noise, visible exterior, including ducts, damage, corrosion, rust, oil leakage, frost on heat exchanger.  [Refrigerators] ✓ Watching for symptoms of refrigerant leakage such as abnormal noise, visible exterior, including ducts, damage, corrosion, rust, oil leakage, frost on heat exchanger. ✓ The temperature inside the equipment.  ※If refrigerant leakage or any signals of leakage are found as a result of the above, specialized inspections must be carried out by experts.		Once in every three months	No special qualification is required.
Periodical check (intended for commercial RAC equipment larger than a certain scale)	Visual check by experts	Leakage point is identifiable	[Refrigerators] 7.5 kW or larger Once / year  [Air conditioners] 50 kW or larger Once / year	Must be conducted by qualified personnel.
		Other cases	Indirect method (measurement of items that indicate the condition of the equipment such as pressure level inside the evaporator and voltage of the compressor motor)  7.5kW or larger (smaller than 50kW) Once / 3 years	

Equipment using refrigerants which are not defined as fluorinated gases under the new law, such as HFO and CO<sub>2</sub>, are not within the scope of this mandatory periodical check.

In addition, a licensing system for the reclamation of fluorinated gases will be introduced under the new law.

## Netherlands

### Information on implementation of paragraph 9 of decision XIX/6

By paragraph 3 of decision XXV/5, the Meeting of the Parties encourages Parties to provide to the Ozone Secretariat, “on a voluntary basis, information on their implementation of paragraph 9 of decision XIX/6, including information on available data, policies and initiatives pertaining to the promotion of a transition from ozone-depleting substances that minimize environmental impact wherever the required technologies are available”. Paragraph 9 of decision XIX/6 encourages “Parties to promote the selection of alternatives to HCFCs that minimize environmental impacts, in particular impacts on climate, as well as meeting other health, safety and economic considerations”.

In the context of decisions XIX/6 and XXV/5, “minimize environmental impact” is understood to refer to avoiding high-global warming potential (GWP) substances and technologies when transitioning from ozone-depleting substances (ODS). In view of that, it should be mentioned that in the Netherlands in line with EU policies and regulations, phasing out of ODS has almost been completed. ODS consumption has been phased out since 2010, except for some essential uses (laboratory uses, process agent uses and feedstock uses), critical uses of (reclaimed) halon and the use of reclaimed HCFCs in the refrigeration and air-conditioning servicing sector is still allowed until 2015. Current ODS production has been well below the target for many years now and is only supplying the export market. A quota licensing system is implemented at the EU level.

In line with the EU regulations for implementation of the requirements of the Montreal Protocol, new equipment containing HCFCs has been banned gradually since 1996, depending on the application, starting with solvent uses, refrigerant uses in direct evaporation systems, domestic refrigerators and freezers, mobile air conditioning and in (public) transport. Since 2000, HCFCs were banned for refrigeration equipment in cold stores and warehouses, large RAC equipment (>150kW), since 2002 in all other refrigeration and air-conditioning equipment and since 2004 in heat pumps. In the period 2000-2004 foam applications were also banned stepwise.

Consequently, future transition to alternatives will concern mainly the existing bank of HCFC-based equipment (which is still significant) and the use of high-GWP alternatives that have replaced and are continuing to replace ODS, mainly HFCs. Therefore, the information below pertains mainly to policies, regulations and measures that address HFC use and emissions.

### HFC policies and regulations

HFC policies and regulations need to be seen in the context of Dutch climate and ODS policies in the early '90s. In view of that, a program was set up to develop an inventory of emission sources and policy options for all greenhouse gas emissions. It was found that CFC emissions were contributing almost 15% to national greenhouse gas emissions and it was recognized that the climate impact of non-ODS alternatives should be taken into account. This inventory was the basis for addressing both ODSs and HFCs in the early '90s. Early action was taken by developing **voluntary agreements with industry to reduce HFC process emissions** and to start developing **domestic regulations to minimize HFC emissions**, specifically in the Refrigeration and Air-conditioning sector since 1992.

### Certification requirements to minimize emissions in the RAC sector

This resulted in the so-called STEK system. This certification programme required the following:

- Technical requirements such as for the design of the equipment, the materials to be used, checks to be performed, as well as labeling conditions.
- Companies and personnel installing, maintaining and servicing refrigeration and air-conditioning equipment with a charge size of 3 kg or more, both for mobile and stationary equipment, to be trained and certified with a view to conduct the best practices to minimize emissions.
- Operators of equipment were required to implement a preventive leakage check schedule, varying between 1 and 12 checks carried out annually, depending on the application.
- Operators are required to ensure that a logbook is kept with the installation In order to allow maintenance personnel to identify structural problems with equipment as well as to raise awareness on amounts of ODS or HFCs filled or refilled in the equipment.

- Installation, maintenance and servicing companies are required to keep a 'refrigerant balance' in order to raise awareness of refrigerants used in handling by their companies.

In 1999 an extensive study (NOKS) was undertaken, in order to assess the installed basis of the various synthetic refrigerants used in all RAC sectors and subsectors. It was found that the abovementioned measures contributed to reduce average ODS and HFC leakages of equipment from 25-30% to 5-10%.

Although by this date, the STEK certification system as such is no longer required, most of the requirements mentioned above, except for the specific technical requirements that had become outdated, are still a central part in the regulations that evolved, including in the existing EU F-gas regulation that is directly applicable in EU Member States. Both for the 'old' regulation (EC) 842/2006 and the 'new' F-gas regulation (EU) No 517/201. Naturally, the same requirements are also applicable to HCFC containing equipment.

### **Reduction Programme for non-CO2 greenhouse gases**

Since 1999 a Reduction Programme for non-CO2 greenhouse gases was developed aiming at defining policies and options for addressing non-CO2 greenhouse gases, including HFCs. The general approach of the programme was for all non-CO2 greenhouse gas emission sources in a staged approach to:

- Identify source, emission and level of certainty of emission
- Identify possible measures and reduction potential
- Prioritization and a stepwise approach
- Develop sector/source specific measures/instruments
- Implementation
- Identify data requirements for monitoring (and reporting)

The Reduction Programme non-CO2 greenhouse gases is characterized by a sectoral approach and involving the relevant stakeholders in each sector, once specific instruments are being developed.

Relevant to HFCs the instruments developed under this programme are outlined below (for the sake of completeness an overview of the development of ODS and HFC regulations is provided from 1988 as an annex to this document). Given the fact that many steps have been implemented already, the programme today has been substantially reduced. Today the main focus is on promotion of alternatives to HFCs, besides implementation of the EU F-gas regulation, which is expected to substantially contribute to accelerate the uptake of alternatives. Based on the emission trends the focus of the programme in the coming years will be mainly on reducing HFCs in supermarkets and (food processing) industry, transport.

### **Voluntary agreements:**

- With industry to implement measures to further reduce HFC-23 from halocarbon production.
- With the foam blowing industry it was agreed earlier to prevent transition from CFCs to HCFCs as well as high GWP-HFCs.
- In the Multiyear Agreements on Energy Efficiency improvement with more than 30 industry sectors, it is agreed in 2008 that companies will take into account direct emissions of the refrigerant, when choosing alternatives for HCFC containing equipment. Eg for supermarkets it was found that almost 50% of their total greenhouse gas emissions were from direct emissions from refrigerants.

**Emission limits in environmental permits:** awareness raising with competent authorities to gradually lowering emission thresholds in environmental permits, based on the outcomes of measures taken under the voluntary agreements (to encourage measures to be taken and to prevent backsliding)

**Regulatory Requirements for emission controls:** Containment measures for HFCs were already regulated in NL legislation since 1995. In the context of the EU F-gas regulations, focus has been on

provisions relevant for ensuring containment measures being implemented and introducing bans for equipment where alternatives are readily available. Most recently focus was on agreeing a phase down schedule for the use of HFCs.

**Promoting low GWP alternatives:** different instruments were available in the Programme Reduction non-CO<sub>2</sub> greenhouse gases:

- Annually, **limited funds** were provided, starting with those sectors with the highest average emissions. These funds were used for support of:
  - Feasibility studies for HFC-free and energy-efficient alternatives in all relevant sectors
  - Demonstration projects for HFC-free and energy-efficient alternatives in all relevant sectors
  - Good Practice Guidance documents to support end-users in choosing alternatives for HCFC or HFC equipment, taking into account both direct and indirect emissions of equipment.
  - Specific studies, such as (sub)sectoral studies to identify and address barriers to convert to HFC-free or low-GWP alternatives as an input to subsidy programmes for energy efficient and low-GWP alternatives
  - Development of the first curriculum of the training centre for handling natural refrigerants in installation, maintenance and servicing initiated by the industry.
- **An information exchange/knowledge centre** was set up, to provide information regulations, policies and alternatives and for both industry and competent authorities focusing specifically on synergies with energy efficiency improvement programmes.
- **A targeted approach** was developed on a sectoral basis, based on workshops and interviews with the relevant stakeholders:
  - to raise awareness with stakeholders on availability and costs of alternatives
  - identify specific barriers specific for the relevant sectors
  - identify options to reduce those barriers
  - develop for each sector a stepwise approach to accelerate transition towards HFC-free or low-GWP and energy efficient alternatives.

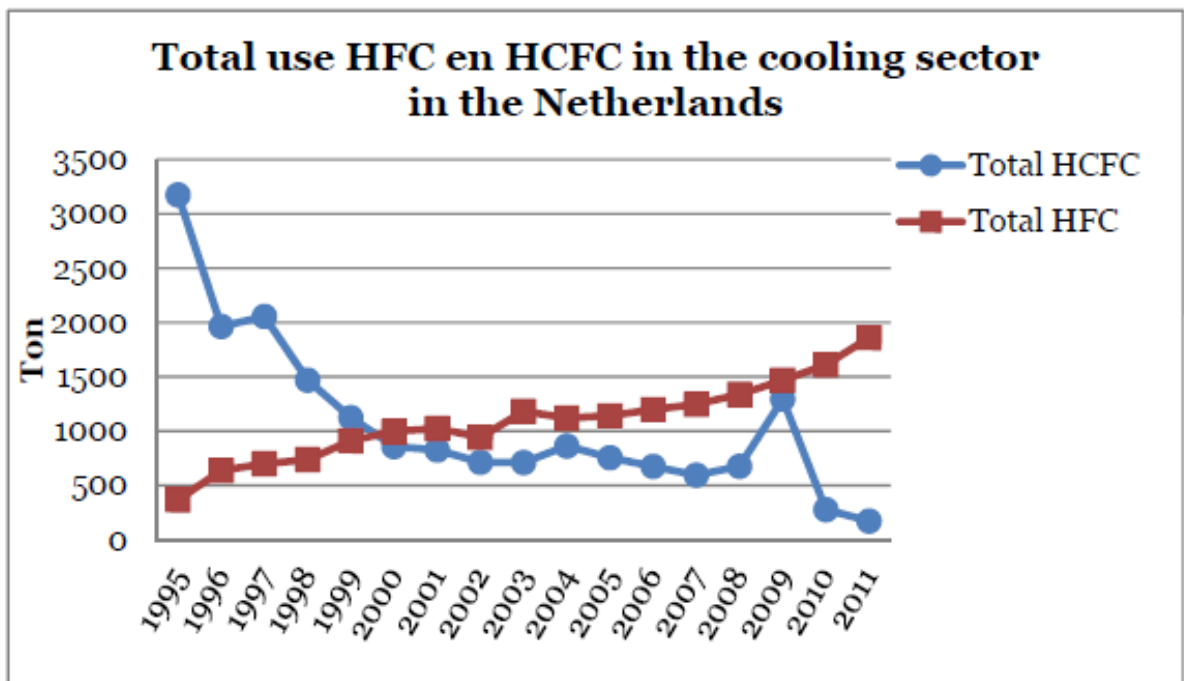
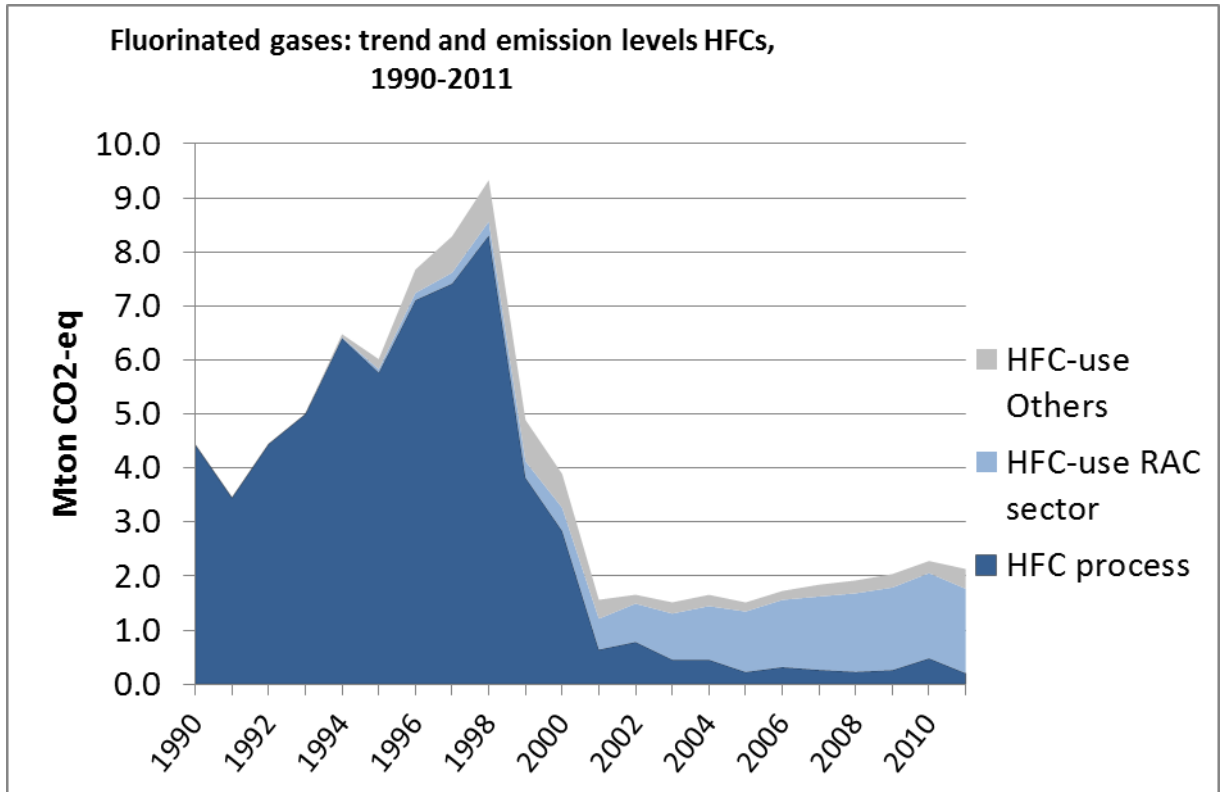
Sofar, focus has been in addressing datawarehouses, supermarkets, food processing industry, hospitals, schools and refrigerated transport, including the shipping industry.

### Monitoring and Reporting

- **Emission estimates for HFCs** are based on the requirements under the IPCC guidelines, and are reported in line with the provisions of UNFCCC and KP.
  - For the **refrigeration and air-conditioning sector** as well as the **foam sector** emissions are derived from statistical data on installed capacity, leakage rates, amounts of HFCs sold for use in the NL
  - **Process emissions** (by-product emissions, as well as emissions from handling and re-packaging) from industry are monitored and reported in their annual environmental report
  - **Solvent uses** of HFCs are very limited
- **Data collection to verify emission estimates** Annually import-, export- and placing on the market data for HCFCs and HFCs to be used as refrigerants, solvents, blowing agents, etc. is collected and reported. Furthermore a multiyear stepwise approach is developed to verify emission estimates for the RAC sectors at a sectoral basis, by collecting representative samples of data on the installed capacity as well as leakages registered in the logbooks. The outcome of these studies are used to prioritize policy interventions, based on the impact of emissions on a sectoral basis, also taking into account the installed HCFC capacity that still needs to convert and trends of alternative choices.

**HFC trends**

In view of the longer term climate objectives to reach 80-95% reduction of greenhouse gas emissions the ambition is to reduce the use and emissions of F-gases by 60-70% in 2030, in line with the EU policies agreed in 2014. According to our projections in 2020 HFC emissions would increase by 20% and by 35% in 2030, without the EU regulation. With the EU regulation, emissions are expected to decrease by 15% in 2020 and 8% in 2030. The figures below show the trends for HFC uses as well as HFC emissions until 2011.



The following **lessons learned** were relevant to further develop the strategy for addressing HFCs and supporting a phase down approach to be developed under EU regulation:

- HFCs are used in a variety of sectors, by a variety of stakeholders
- A variety of instruments is necessary to target specific sectors or stakeholders
- Low hanging fruit is already addressed in the NL
- HFCs use and emissions are growing, specifically in the RAC sector
- Containment policy has improved:
  - Awareness improved significantly
  - Leakage rates improved overall (25% of installations >300kg are responsible for more than 95% of emissions)
  - Education and training of personnel improved
  - Creation of stakeholder platform improved communication and information flow
- Regulatory requirements need to be flexible (to take into account and not hamper technology updates)
- Monitoring and reporting are an important factor to create awareness and to follow trends (eg foam sector)

**Main focus in addressing HFCs at present:**

- Implementing HFC phase down requirements of EU regulation in national regulations.
- Strengthen/improve Containment measures and Good Practices F-gases
  - Develop top 10 causes strategy for large installations together with industry
  - Improve certification system and enforcement
- Continue promoting alternatives, taking into account energy efficiency
  - Tax refund for energy efficient equipment applies to HFC-free equipment, where alternatives are available
  - Support training and information on alternatives for industry and Competent Authorities
- Voluntary agreements (Green Deals) with end-users

**Annex I**

**Overview of Regulatory Requirements for emission controls:**

**1988-1992** – development of NL programme for emission controls (CFCs)

**1991 EU Regulation on ODS:** phase out schedule CFCs

**1992** – Organisation **STEK** assigned in Regulation for emission controls (CFCs):

- Develop certification scheme (acknowledgement)

**1994 – EU Regulation on ODS:** inclusion requirements for precautionary measures to reduce emissions

**1994 – NL Regulation leak tightness controls**

- STEK Certified personnel/Company
- Logbook/Refrigerant register
- Leakage check requirements
- Technical requirements on installation
- Information requirements (e.g. labelling and signs)
- Includes CFCs, HCFCs (since 1995 HFCs (and PFCs) are included)

**1994 – NL Regulation recovery of solvents and detergents**

**1995 – NL Degree on greenhouse gases:**

- precautionary principle



- announces regulations for emission prevention of F-gases
- inclusion of HFCs under STEK

**2000 – EU Regulation on ODS:** stricter measures for HCFC phase out and emission prevention, as well as recovery provisions

**2006 - EU regulations on F-gases:** requirements on:

- Leakage check frequency
- Certification of personnel/companies
- Application specific bans

**2007/8 EU regulations on F-gases:** minimum requirements for certification of personnel/companies, leakage checks

**2009 – EU Regulation on ODS:** stricter measures for HCFC phase out, servicing requirements, recovery provisions as well as preventive leakage controls and certification

**2009 – NL Degree and ODS and F-gases regulations on containment and certification:** basic implementation of EU regulations on ODS and F-gases

**2011 – NL Regulation on certification personnel and companies (a.o. RAC and mobile airco)**

- Requirements certified personnel/Company EU ozone/F-gases regulations
- Refrigeration management system/register – companies
- Logbook - installation
- Leakage check requirements (frequency and installation checks)
- Recovery requirements
- 6 certifying bodies company certification
- STEK → Examination body
- Includes CFCs, HCFCs and HFCs (and PFCs)
- No technical requirements for installations
- Simplification Labelling- and company certification requirements in line with EU regulations

**2014 – EU F-gas Regulation:**

- Containment measures:
  - Preventive leakage check requirements
  - Certification requirements
  - Recovery requirements
- Labelling requirements
- Monitoring and reporting requirements (logbook)
- HFC phase down schedule
- Application specific bans on the use of HFCs

**Legislative requirements on recovery before end-of-life:**

**1998 – Degree White- and Brown goods:** producer responsibility scheme, including ban on selling or exporting 2<sup>nd</sup> hand domestic fridges containing or relying on CFCs.

**2000 – Regulation requirement End of Life handling of (H)CFC containing RAC equipment**

- Technical requirements

**2008: NL Degree and Regulation on Waste of electrical and electronic equipment:**

- Replaced the regulations of 1998 and 2000 above
- (Implementation of EU Directive – WEEE):
- targets for recovery and re-use (recycling, reclamation).
- Based on producer responsibility scheme.
- Extended to Commercial and Industrial RAC equipment in NL regulation compared to EU directive.

## Switzerland

### Overview of the Swiss policy on substances stable in the atmosphere SSA (F-gas)

*(This overview is provided for information purposes only and has no legal force – Status 1.1.2014)*

**The Swiss regulation on Substances stable in the atmosphere** is contained in the Ordinance on the Reduction of Risks relating to the Use of Certain Particularly Dangerous Substances, Preparations and Articles (Chemical Risk Reduction Ordinance, ORRChem). It is distributed in annexes specific to the following sectors of use: **Substances Stable in the Atmosphere (SSA), Solvents, Synthetic foams, Refrigerants, Extinguishing agents, Spray cans.**

**It has been decided by the Swiss Federal Council first in 2003 and amended in November 2012. The following summarizes the actual regulation with the recent amendments being underscored.**

#### The Main objectives are as follows:

- To underscore the persistence of the Fluorinated Greenhouse Gases in calling them Substances Stable in the Atmosphere (SSA)
- to minimise the emissions of Fluorinated Greenhouse Gases at minimal marginal costs
- to discourage the development of new applications which would require future regulation
- to avoid potential regulatory loopholes (unregulated persistent Fluorinated Greenhouse Gases)
- to support the industry in developing long term reliable strategies
- to promote the implementation of Life Cycle Climate Performance
- to promote the development and marketing of environmentally friendly technologies

#### The Strategy is as follows:

- To limit the use of Fluorinated Greenhouse Gases to those applications for which other products or techniques are not applicable or environmentally worse.
- To allow, when recognised necessary, time limited essential use exemptions upon technically justified requests.
- To implement emission reduction measures for the allowed applications of Fluorinated Greenhouse Gases.
- To consider voluntary commitments developed by industrial branches.

#### Substances Stable in the Atmosphere (SSA)

##### ➤ Definition

- Fluorinated organic compounds with vapour pressure of at least 0,1 mbar à 20°C or boiling point lower than 240°C à 1013,25 mbar, with T (Lifetime in atmosphere) > 2 years *(includes some HFE but excludes HFC 152a)*
- SF6 and NF3

##### ➤ General use ban with specific exceptions for:

- specific uses defined in the annexes 2.3 to 2.12 relating to specific sectors
- semiconductor production processes with emission rate < 5%
- feedstock uses in processes with emission rate < 0.5%
- analytic & research purposes
- SF6 as far as necessary and emissions are kept as low as possible in high voltage components of imaging equipment, mini-switches,
- SF6 within the High voltage equipment industry
- ❖ SF6 in Mg – Al foundries until end of 2016 only
- ❖ heat transfer or insulation fluids in welding machines and in testing and calibration baths

##### ➤ Mandatory communication to the national authorities of imported quantities of SSA.

##### ➤ Voluntary Agreement regarding SF6 within the High voltage industry including:

- Exact consumptions and emissions yearly inventories

- Maximum yearly emissions: < 1% of imported quantities and < 4 metric tonnes
- Avoidance of emissions during production, operation, maintenance and disposal of high voltage switch equipment
- Effective research on better solutions
- Equipment containing SF6 only where and when no alternative are available

### Solvents

- **General ban of SSA based solvents and products containing such solvents.**
- **Exception for SSA** used for surface treatment in installations fulfilling the Clean Air Ordinance annex 2 figure 87 requirements (installation with automatic closing system opening only when SSA concentration in the installation's atmosphere is below 1g/m<sup>3</sup>; SSA emissions mass flux < 100g/h).
- ❖ **Prohibition of mixing, take-back obligation, feasibility assessment of recycling**

### Synthetic foams

- Ban of supply and use of the non-insulating foams manufactured with SSA.
- Ban of supply and use of foams containing SSA as far as the required thermal insulation can be obtained otherwise in a safe, economical and environment friendly manner.

### Refrigerants

- Ban of putting on the market of domestic appliances containing SSA, with possibility for temporary exemptions upon technically justified requests.
- ❖ **Since 1.12.2013, ban of placing on the market for the following stationary systems using SSA refrigerants:**
  - a. **Air conditioning systems for:**
    - 1. cooling with a cooling capacity of more than 600 kW,
    - 2. cooling and heating by means of variable refrigerant flow (VRF) or variable refrigerant volume (VRV) systems with more than 40 evaporator units and a cooling capacity of more than 80 kW,
    - 3. domestic and district heating by heat pump with a cooling capacity of more than 600 kW;
  - b. **commercial refrigeration systems for:**
    - 1. minus cooling with a cooling capacity of more than 30 kW,
    - 2. plus cooling with a cooling capacity of more than 40 kW;
    - 3. minus cooling with a cooling capacity of more than 8 kW when combined with plus cooling;
  - c. **industrial refrigeration systems for:**
    - 1. deep freezing with a cooling capacity of more than 100 kW,
    - 2. all other applications with a cooling capacity of more than 400 kW;
  - d. **ice rinks, except for temporary systems.**
- ❖ **Exemption can be granted for a particular system upon technically justified requests if:**
  - a. in the current state of the art, it would not be possible for the standards SN EN 378-1:2008+A1:2010, SN EN 378-2:2008+A1:2009 and SN EN 378-3:2008 to be complied with without the use of a refrigerant stable in the atmosphere;
  - b. in the current state of the art, the refrigerants stable in the atmosphere with the lowest climate impact have been specified for use; and
  - c. state-of-the-art measures have been taken to prevent refrigerant emissions.

*Rational: The past mandatory authorisation scheme has allowed the natural refrigerants to better penetrate the Swiss market in such a way that the refrigeration industry association has evaluated itself that in these sectors, the cooling/ heating needs can be optimally covered with technologies using natural refrigerants*

- Measures to reduce the charge of SSA based refrigerants:  
Ban of placing on the market of stationary systems in all applications as follows (no exemptions):
  - Systems with an air-cooled condenser and containing a refrigerant with a GWP above 4'000,
  - Systems with an air-cooled condenser, containing a refrigerant with a GWP above 2'000 and a cooling capacity above 100 kW,
  - Direct expansion air cooling systems connected to more than 2 evaporators and a cooling capacity above 80 kW.
- Requirements for stationary systems with more than 3 kg refrigerant
  - Yearly tightness control
  - Mandatory maintenance booklet
  - Mandatory reporting of commissioning or decommissioning of stationary systems containing ODS or SSA based refrigerants

#### **Extinguishing Agents**

- **Ban of putting on the market of SSA based Extinguishing agents and equipment containing them.**
- **Exemptions** for aircrafts, military vehicles, nuclear plants, and upon technically justifies requests in further similar situations safety of persons cannot be assured without the use of SSA

#### **Aerosol dispensers**

- **Ban of manufacturing and placing on the market of Aerosol dispensers containing SSA exemptions for**
  - MDIs.
  - One component spray foams (safety reasons)
  - Cleaning of equipment under electric tension

#### Criteria:

- a. the state of the art is such that substitution is not possible;
- b. the quantity of substances stable in air used does not exceed the quantity required by the state of the art; and
- c. only those substances stable in air with the shortest possible lifetime in air are used.

#### *Resources*

- Switzerland Federal Office for the Environment (FOEN). 2010. Synthetic greenhouse gases and climate protection  
<http://www.bafu.admin.ch/chemikalien/01389/01404/index.html?lang=en>
- Switzerland Federal Office for the Environment (FOEN). 2003. Synthetic greenhouse gases under control and better protection of ozone layer. Available at:  
<http://www.bafu.admin.ch/dokumentation/medieninformation/00962/index.html?lang=en&msg-id=1667>.
- Switzerland Federal Office for the Environment (FOEN).. (Not including amendments entering into force after 1.1.2014) Ordinance on the Reduction of Risks relating to the Use of Certain Particularly Dangerous Substances, Preparations and Articles (Chemical Risk Reduction Ordinance, ORRChem). Available at:  
[http://www.admin.ch/ch/e/rs/814\\_81/index.html](http://www.admin.ch/ch/e/rs/814_81/index.html)

## United States of America

### *Additional information in response to Decision XXV/5, paragraph 3*

United States Climate Action Report 2014 - accessible at: <http://www.state.gov/documents/organization/219038.pdf>. This report contains two documents that respond to reporting requirements under the UNFCCC. One of those documents, *First Biennial Report of the United States of America*, includes appropriate information:

- The Biennial Report outlines how U.S. action on climate change puts the United States on a path to reach its commitments in Copenhagen, Cancun, and Durban, covering the period up to 2020. **In particular, pages 16-17 highlights HFCs as one of the key categories of action for achieving additional emission reductions.**

EPA has recently proposed two new regulations concerning HFCs:

- **Proposal to prohibit certain high-GWP HFC alternatives:** *In support of President Obama's Climate Action Plan, the U.S. Environmental Protection Agency (EPA) is proposing to change the listing status of certain high-global warming potential chemicals that were previously listed as acceptable, based on information showing that other substitutes are now available for the same uses that pose lower risk overall to human health and climate. Specifically, EPA proposes to change the listings for certain hydrofluorocarbons (HFCs) from acceptable to unacceptable in various end-uses in the aerosols, refrigeration and air conditioning, and foam blowing sectors. EPA also proposes use conditions that would restrict the use of HFCs as aerosol propellants to those uses where there are not substitutes available or potentially available that reduce overall risk to human health and/or the environment.*
- Proposed rule: <http://www.gpo.gov/fdsys/pkg/FR-2014-08-06/pdf/2014-18494.pdf>
- Fact sheet: [http://www.epa.gov/ozone/snap/download/SAN\\_5750\\_SNAP\\_Status\\_Change\\_Rule-FactSheet\\_080114.pdf](http://www.epa.gov/ozone/snap/download/SAN_5750_SNAP_Status_Change_Rule-FactSheet_080114.pdf)<sup>3</sup>

**Proposal to add additional climate-friendly refrigerant alternatives:** *The EPA is proposing to increase the options for refrigerants in the United States that offer better climate protection without harming the ozone layer. EPA is proposing to list certain climate-friendly hydrocarbons (ethane, isobutane, and propane) and a hydrocarbon blend (R-441A) as acceptable in stand-alone commercial and household refrigerators and freezers, very low temperature refrigeration, non-mechanical heat transfer, vending machines, and room air conditioning units. EPA is also proposing to list HFC-32 as acceptable in room air conditioning units. HFC-32 has one-third the GWP of the conventional refrigerants currently being used in room air conditioning units.*

- Proposed rule: <http://www.gpo.gov/fdsys/pkg/FR-2014-07-09/pdf/2014-15889.pdf>
- Fact Sheet: [http://www.epa.gov/ozone/downloads/Low\\_GWP\\_refrigerants\\_NPRM\\_RIN\\_2060-AS04%20-%20Fact\\_Sheet-5-29-14\\_final.pdf](http://www.epa.gov/ozone/downloads/Low_GWP_refrigerants_NPRM_RIN_2060-AS04%20-%20Fact_Sheet-5-29-14_final.pdf)<sup>3</sup>

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<sup>3</sup> Fact sheet attached for ease of reference

## FACT SHEET

**Proposed Rule - Protection of Stratospheric Ozone: Change of Listing Status for Certain Substitutes under the Significant New Alternatives Policy Program**

**ACTION**

Under this proposed rule, various hydrofluorocarbons (HFCs) and HFC-containing blends that were previously listed as acceptable alternatives to ozone-depleting substances (ODS) will be listed as unacceptable for some uses. This proposed rule is part of the Significant New Alternatives Policy (SNAP) program, under which the EPA continuously reviews alternatives to ODS to find substitutes that pose less overall risk to human health and the environment. As safer alternatives become available for particular applications, the list of acceptable substitutes is evaluated and revised.

The following are the proposed changes in listing status:

- 1) For ***aerosol propellants***, as of January 1, 2016
  - HFC-125 as unacceptable;
  - HFC-134a as acceptable, subject to use conditions, allowing its use only in specific types of technical and medical aerosols (e.g. metered dose inhalers) (and prohibiting its use in consumer aerosols); and
  - HFC-227ea as acceptable, subject to use conditions, allowing its use only in metered dose inhalers.
- 2) For ***motor vehicle air conditioning systems*** in newly manufactured, light-duty vehicles
  - HFC-134a as unacceptable starting with model year (MY) 2021; and
  - The refrigerant blends SP34E, R-426A (also known as RS-24), R-416A (also known as HCFC Blend Beta or FRIGC FR12), R-406A, R-414A (also known as HCFC Blend Xi or GHG-X4), R-414B (also known as HCFC Blend Omicron), HCFC Blend Delta (also known as Free Zone), Freeze 12, GHG-X5, and HCFC Blend Lambda (also known as GHG-HP) as unacceptable starting with MY 2017.
- 3) For ***new and retrofit retail food refrigeration (including stand-alone equipment, condensing units, direct supermarket systems, and indirect supermarket systems) and for new and retrofit vending machines***, as of January 1, 2016
  - The HFC blends R-507A and R-404A as unacceptable.
- 4) For ***new and retrofit retail food refrigeration (including direct supermarket systems and indirect supermarket systems)***, as of January 1, 2016
  - HFC-227ea, R-407B, R-421B, R-422A, R-422C, R-422D, R-428A, and R-434A as unacceptable.
- 5) For ***new, stand-alone retail food refrigeration and new vending machines***, as of January 1, 2016
  - HFC-134a and certain other HFC refrigerant blends as unacceptable.
- 6) For ***foam blowing agents***, as of January 1, 2017, except where allowed under a narrowed use limit
  - HFC-134a and blends thereof as unacceptable in all foam blowing end-uses;
  - HFC-143a, HFC-245fa and HFC-365mfc and blends thereof, and the HFC blends Formacel B, and Formacel Z-6 as unacceptable in all foam blowing end-uses where they are currently listed as acceptable, except for spray foam applications; and
  - The HFC blend Formacel TI as unacceptable in all foam blowing end-uses where it is currently listed as acceptable.

This rule also proposes to list as unacceptable certain hydrochlorofluorocarbons (HCFCs) being phased out under the Montreal Protocol where substitutes are available that pose overall lower risk to human health and/or the environment.

## BACKGROUND

- This proposal responds to the President's Climate Action Plan by prohibiting certain uses of high global warming potential (high-GWP) HFCs where alternatives are available that are safer for human health and the environment.
- The emissions reductions from this proposed rule are estimated to be 31 to 42 million metric tons of carbon dioxide equivalent (MMTCO<sub>2</sub>eq) in 2020.
- Under the Significant New Alternatives Policy (SNAP) program (Section 612 of the Clean Air Act), EPA continuously reviews alternatives to ozone-depleting substances (ODS) to find substitutes that pose less overall risk to human health and the environment and issues updates to the lists of acceptable and unacceptable substitutes.
- Section 612 mandates EPA to prohibit the use of a substitute that may present risk to human health or the environment where a lower risk alternative is available or potentially available and provides EPA with the authority to change the listing status of a particular substitute if such a change is justified by new information or changed circumstance.
- Over the past year and increasingly since the Climate Action Plan's announcement in June 2013, EPA has engaged with potentially affected stakeholders and received valuable input through conducting seven sector-focused workshops and two broad SNAP stakeholder meetings.
- In its determination to change the status of a number of substitutes that were previously listed as acceptable, SNAP's evaluation considered all the risk factors reviewed by SNAP including ozone depletion potential as well as flammability, toxicity, occupational health and safety, and contributions to climate change and other environmental factors.
- Based on this evaluation and information showing that other substitutes are available for the same uses that pose lower risk overall to human health and/or the environment, this action proposes to modify the listings for certain high-GWP HFCs in various end-uses in the aerosols, refrigeration and air conditioning, and foam blowing sectors.
- This action also proposes to modify the listings for certain HCFCs from acceptable to unacceptable where substitutes are available that pose overall lower risk to human health and/or the environment; the HCFCs are listed for use in the aerosols, foam blowing agents, fire suppression and explosion protection agents, sterilants, and adhesives, coatings and inks sectors.
- HCFCs are being phased out of production under the Montreal Protocol and the Clean Air Act, where regulations issued under other sections (605 and 610) already restrict their use in many applications. Changes to the status of HCFCs in this action are consistent with the goals of the Montreal Protocol.

## FACT SHEET

### **Proposed Rule - Protection of Stratospheric Ozone: Listing of Substitutes for Refrigeration and Air Conditioning and Revision of the Venting Prohibition for Certain Refrigerant Substitutes RIN 2060-AS04**

#### **ACTION**

This rulemaking lists additional climate-friendly, flammable substitutes as acceptable, subject to use conditions, in new equipment in six end-uses. The updates to the listings are as follows:

- Ethane in very low temperature refrigeration and in non-mechanical heat transfer
- Isobutane in retail food refrigeration (stand-alone commercial refrigerators and freezers) and in vending machines
- Propane in household refrigerators, freezers, or combination refrigerators and freezers, in vending machines, and in room air conditioning units
- The hydrocarbon blend R-441A in retail food refrigeration (stand-alone commercial refrigerators and freezers), in vending machines and in room air conditioning units
- HFC-32 (difluoromethane) in room air conditioning units

The proposed rule contains use conditions to address potential flammability risks of the refrigerants. The proposed use conditions include limits on charge size, use in newly manufactured equipment only, use of colored pipes and/or hoses, and meeting relevant Underwriters Laboratories standards including, among other things, use of warning labels.

In addition, the proposed rule would allow for the release of the first four refrigerants during service, maintenance, repair and disposal based on current evidence that their release would not pose a threat to the environment.

#### **POTENTIALLY AFFECTED ENTITIES**

This rulemaking provides additional options for manufacturers of refrigeration and air conditioning equipment. Technicians servicing or disposing of such equipment are also affected by this rule and would have greater flexibility given a proposed exemption from the Clean Air Act's prohibition on venting, release or disposing of refrigerant during maintaining, servicing, repairing, or disposing.

#### **BACKGROUND**

- Under the Significant New Alternatives Policy (SNAP) program (Section 612 of the Clean Air Act), EPA reviews alternatives to ozone-depleting substances (ODS) to find substitutes that pose less overall risk to human health and the environment.
- This rule responds to the Climate Action Plan's call for the Environmental Protection Agency to "use its authority through the Significant New Alternatives Policy Program to encourage private sector investment in low-emissions technology by identifying and approving climate-friendly chemicals..."
- These provisions are designed to allow for additional climate-friendly alternatives and do not impose regulatory burdens beyond use conditions designed to ensure safe handling of flammable compounds. The substitutes are not ozone-depleting, and they have lower global warming potentials than currently-used refrigerants.



- EPA previously issued a final rule with the same or similar conditions on the use of flammable refrigerants in household and commercial stand-alone refrigerators and freezers (December 20, 2011; at 76 FR 78832, codified at Appendix R of Subpart G of 40 CFR Part 82).
  - Hydrocarbons are already widely used as refrigerants in refrigerators and freezers in Europe and Asia, and to a lesser extent, in room air conditioners. Because hydrocarbon refrigerants have zero ozone depletion potential (ODP) and very low global warming potentials (GWPs) compared to most other refrigerants, many companies recently have expressed interest in using hydrocarbons in the United States. Also, some companies have reported improved energy efficiency with hydrocarbon refrigerants.
  - There is interest in use of HFC-32 in residential air conditioning systems and heat pumps because it has a GWP of 675, which is lower than the GWPs of currently-used refrigerants for this end-use (GWPs of 1,500 to 4,000). It also has milder flammability than hydrocarbon refrigerants.
  - Under Section 608 of the Clean Air Act, it is illegal to intentionally vent or release refrigerants during the maintaining, servicing, repairing or disposing of appliances or industrial process refrigeration. EPA has authority under the Clean Air Act to issue exemptions to this “venting prohibition” where the Agency determines that venting, releasing or disposing of a substitute refrigerant does not pose a threat to the environment.
  - EPA has analyzed the potential environmental impacts of allowing release of four of the five refrigerants into the atmosphere (all except HFC-32, because EPA has previously determined it has sufficient environmental impact to maintain the venting prohibition). Based on this analysis and other information, EPA expects that release of ethane, isobutane, propane, and the hydrocarbon blend R-441A in the limited amounts from the proposed end-uses will not pose a threat to the environment.
-