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**Open-ended Working Group of the Parties to  
the Montreal Protocol on Substances that  
Deplete the Ozone Layer  
Thirty-fourth meeting**

Paris, 14–18 July 2014

Item 5 (c) of the provisional agenda\*

**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**

**Submission by the United States of America**

**Note by the Secretariat**

The annex to the present note contains a report entitled *Compendium of Policies Governing Hydrofluorocarbons (HFCs)*, submitted by the United States of America. The report, on the country's actions to promote low-global-warming-potential alternatives, forms part of the submission of the United States in response to decision XXV/5 and provides information pertinent to decision XIX/6. The information is reproduced as received by the Secretariat, without formal editing.

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\* UNEP/OzL.Pro.WG.1/34/1.

**Annex**

# Compendium of Policies Governing Hydrofluorocarbons (HFCs)

**January 24, 2014**

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## 1. Introduction

Hydrofluorocarbons (HFCs) are potent, man-made fluorinated greenhouse gases (GHGs) that are hundreds or even thousands of times more potent than carbon dioxide (CO<sub>2</sub>). HFCs are used in a variety of applications, predominantly as alternatives to the ozone-depleting substances (ODS) that are being phased out under the *Montreal Protocol on Substances that Deplete the Ozone Layer* (Montreal Protocol). Although safe for the ozone layer, the continued emissions of HFCs will have an immediate and significant effect on the Earth's climate system. Global concentrations of HFCs in the atmosphere are already rapidly increasing due to the expanding refrigeration and air conditioning sector, particularly in developing countries. Expected growth of HFCs resulting from their use as replacements to ODS could cause HFC emissions to rise and become a significant fraction of CO<sub>2</sub>-equivalent emissions by 2050. As a result, several actors world-wide are taking measures to mitigate consumption and emissions of HFCs.

One collaborative effort to consider HFCs is being undertaken by the Climate and Clean Air Coalition (CCAC) to reduce short-lived climate pollutants (SLCPs). CCAC is the first global effort to treat SLCPs—e.g., black carbon, methane and the majority of HFCs—as an urgent and collective challenge. CCAC is catalyzing rapid reductions in these harmful pollutants to protect human health and the environment and slow the rate of climate change within the first half of this century.

The Coalition is addressing SLCPs by:

- (1) Raising awareness of pollutant impacts and mitigation strategies;
- (2) Enhancing and developing new national and regional actions, including by identifying and overcoming barriers, enhancing capacity, and mobilizing support;
- (3) Promoting best practices and showcasing successful efforts; and
- (4) Improving scientific understanding of pollutant impacts and mitigation strategies.

CCAC is a partnership of governments, intergovernmental organizations, and representatives of the private sector, the environmental community, and other members of civil society. The Coalition is government-led but is highly cooperative and voluntary. Partners endorse the coalition framework and each member individually determines the nature of its participation. More information about the CCAC's actions, partners, and efforts is available at [www.unep.org/ccac/](http://www.unep.org/ccac/).

Given the commitment of CCAC countries, our initial effort to gather information on HFC policies began with outreach to the CCAC countries. A broad overview of the information we were able to find on CCAC countries is included in Section 0 of this document. Following a search for CCAC partner related information, we expanded our search to some other countries that we understood were undertaking HFC related actions. The result of this effort, which can be found in Section 0, is a compendium of some basic information on HFC related policies and activities that are currently ongoing in more than 50 countries. A summary of each policy is provided with information on the name of the policy; country; an overview of the policy; contact person; and a list of pertinent web and other resources. In cases where information on a policy is limited, it is noted to aid in the overall assessment on the relative availability of and access to information.

The compendium also attempts to categorize the actions being undertaken on a policy by policy basis to enable countries considering a specific policy to see how that policy has been implemented in other countries. Policies were categorized by six policy types as defined in Table 1. Individual policies typically cover more than one policy mechanism; a total of 79 policy mechanisms were identified in 45 policies. Additionally a summary matrix, as shown in Table 2, provides a listing of each country identified as having implemented or proposed an HFC policy, by policy type. These countries are organized by region in the compendium (Africa; Europe and Central Asia; Latin America and the Caribbean; North America; Pacific Island Countries; South Asia; Southeast Asia; and West Asia), as illustrated in Figure 1. Although Southeast Asia is not included in Section 3, other HFC initiatives are taking place in the region as mentioned in subsequent sections.

Table 1. HFC Policy Definitions

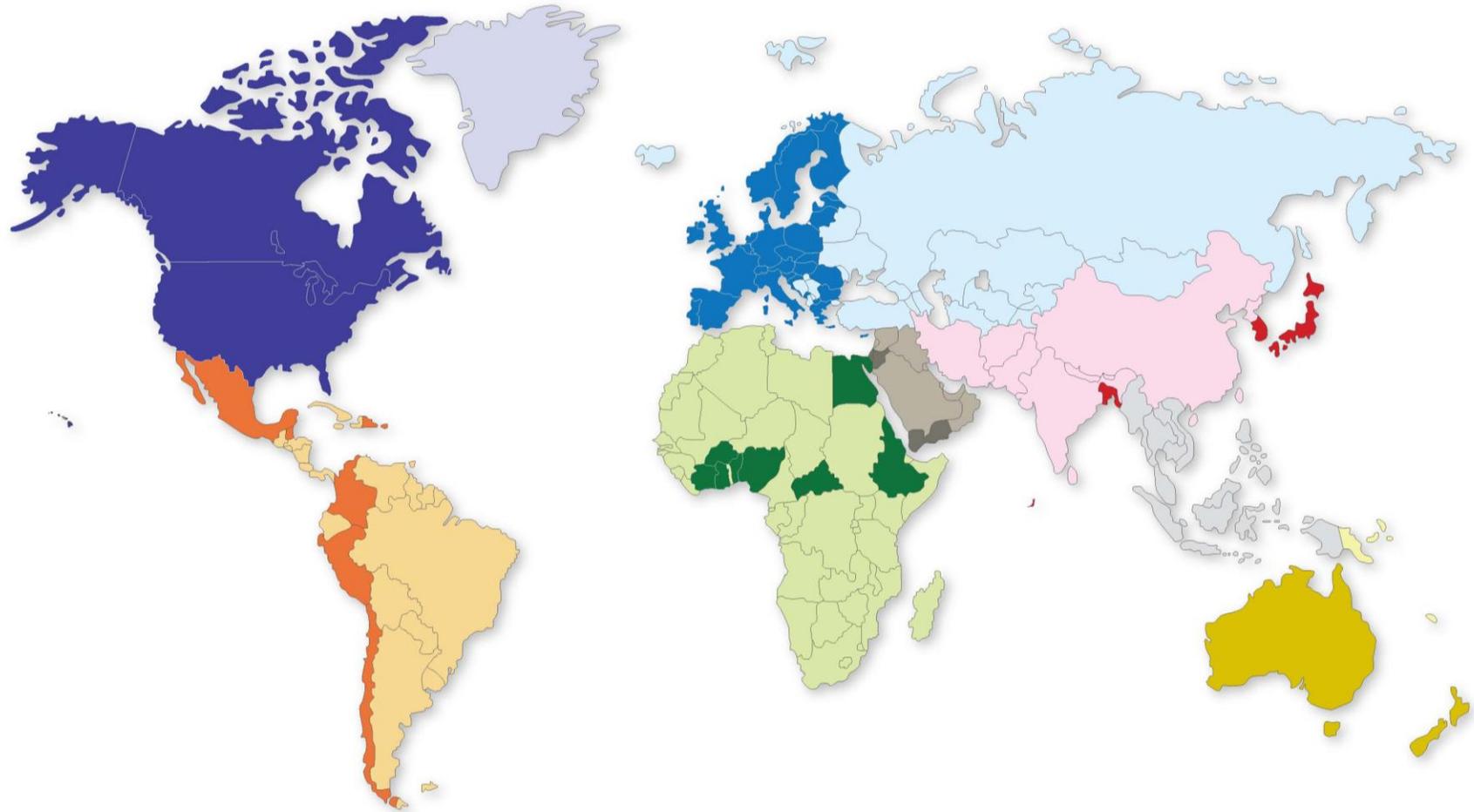
Policy or Program Type	Description
Taxes, Levies, and Other Types of Fees	A tax, duty, levy, fee, or other similar type of charge that is applied to the HFC, a blended substance containing the HFC, or a product containing HFC at the point of import or manufacture or at some other specified point (e.g., vehicle registration).
Economic and Market-Based Incentives	Economic and market-based incentives include: <ul style="list-style-type: none"> <li>• <u>Refund Programs</u>: A system that provides a refund for the return and/or destruction of HFC gases; and</li> <li>• <u>Trading Programs</u>: This may include carbon credit trading or permit trading.</li> </ul>
Prohibition/Authorization	A regulation that partially or fully prohibits or authorizes a certain activity such as the import, export, production, sale, venting, or use of HFCs, a blended substance containing the HFC, or a product containing HFC in some or all industry uses.
Required Practices	A practice required by law. Examples include labeling requirements, training, certification, inspections, gas recovery during service and at end of life, and destruction. Required practices may include the application of standards that are adhered to by the end-user, manufacturer, or other relevant entity.
Import/Export Licensing	A license or permit required by a governing agency for the shipment or manufacture of HFCs.
Reporting /Recordkeeping Requirements	A requirement by a governing agency to document and report on the import, consumption, destruction, or other activity involving HFCs.

Table 2. HFC Policy Summary Matrix

Country/Region	CCAC Partner	Taxes, Levies, Fees	Economic and Market-Based Incentives	Prohibition/Authorization	Required Practices	Import/ Export Licensing	Reporting/ Recordkeeping Requirements	Taxes, Levies, Fees	Economic and Market-Based Incentives	Prohibition/Authorization	Required Practices	Import/ Export Licensing	Reporting/ Recordkeeping Requirements
		Existing HFC Policies						Proposed HFC Policies					
<b>Africa</b>													
Burkina Faso		X				X							
Egypt							X						
<b>Europe and Central Asia</b>													
Austria				X									
Denmark	✓	X		X									
European Union	✓		X	X	X		X						
France	✓							X					
Germany	✓			X	X								
Italy	✓				X		X						
Macedonia		X		X		X							
Montenegro		X		X	X	X	X						
Netherlands	✓		X		X								
Norway	✓	X	X										
Poland	✓	X					X						
Slovenia		X											
Sweden	✓			X	X			X					
Switzerland	✓			X	X		X						
United Kingdom	✓				X								
<b>Latin America and the Caribbean</b>													
Belize					X	X	X						
Colombia	✓			X	X	X							
<b>North America</b>													
Canada	✓			X	X	X	X						
United States	✓	X	X	X	X		X			X			
California (United States)			X		X		X			X	X		
<b>Pacific Island Countries</b>													
Australia	✓	X	X			X	X						
New Zealand	✓	X	X	X	X		X						
<b>South Asia</b>													
China								X					
Japan	✓				X		X						
<b>West Asia</b>													
Yemen					X		X						

In addition to a review of policies, several sections are included that highlight non-policy actions and initiatives that are targeting the reduction of HFC consumption and emissions involving governments, the private sector, or both. This report demonstrates that a range of approaches can be used to limit high-global warming potential (GWP) HFC use and emissions. This compendium may serve as a useful review of existing and proposed policies for those countries that may be considering their own action to address HFCs. There may be other interested audiences as well. For example, this may also offer industry and civil society an overview of how different countries currently treat and plan to address HFCs use and emissions in the future.

Figure 1: Regions of the world. CCAC partners and countries with HFC policies or initiatives have been shaded in a darker color.



## 2. CCAC Partners

As noted, CCAC country partners have been working to identify quick-start actions that will ensure rapid delivery of scaled-up climate benefits by reducing SLCPs in their own countries; helping others take similar actions; and actively participating in the work of the Coalition. Table 3 below presents a broad overview of what we have been able to find out about the policies and other relevant initiatives targeting HFCs that Coalition's current partners are, or are currently considering implementing in their countries.

**Table 3. Country Partners of the Coalition**

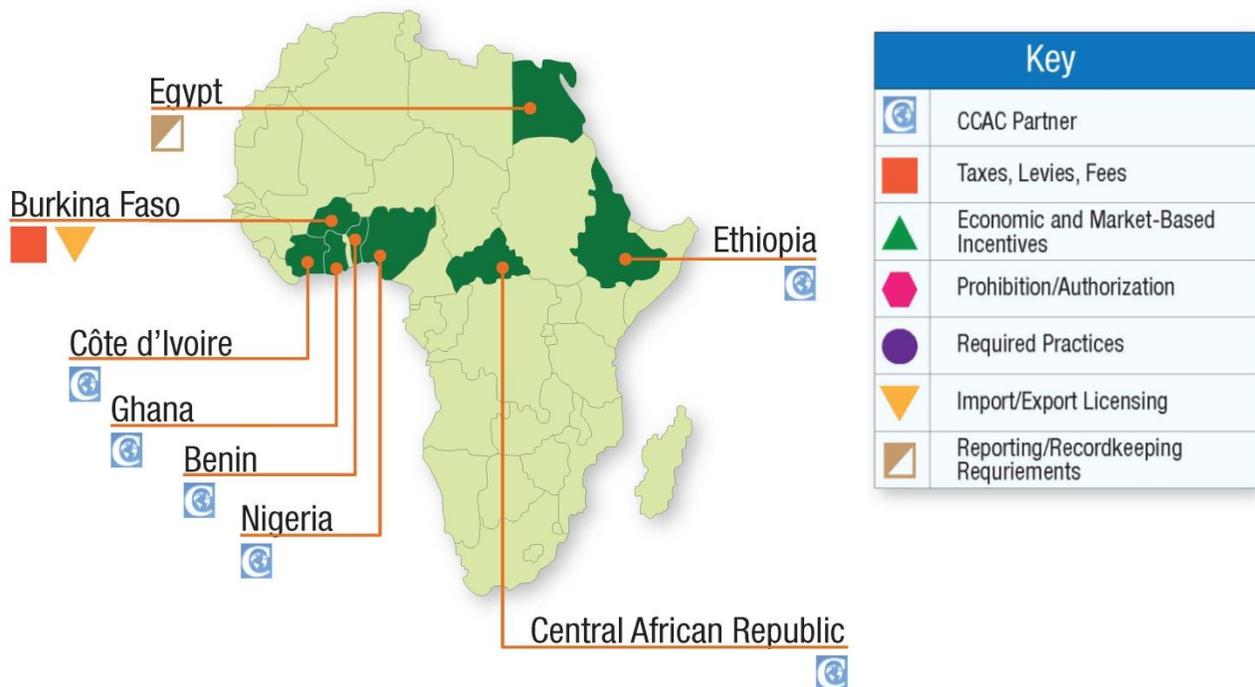
CCAC Partner	HFC Policies, HFC Initiatives
Australia	<ul style="list-style-type: none"> <li>Ozone Protection and Synthetic Greenhouse Gas Management Act 1989 (the Act) and its amendments (includes levies and economic incentives, licenses and reporting requirements, and destruction incentives program)<sup>a</sup></li> </ul>
Bangladesh	<ul style="list-style-type: none"> <li>No information to-date</li> </ul>
Benin	<ul style="list-style-type: none"> <li>No information to-date</li> </ul>
Canada	<ul style="list-style-type: none"> <li>Section 46 of Canadian Environmental Protection Act, 1999 (CEPA 1999) and its amendments (includes emission reporting, recovery/recycling and emission control measures)</li> <li>Proposed regulations to manage HFCs at end of life and a ban on imports of HFC refrigerant in non-refillable containers currently under evaluation</li> </ul>
Central African Republic	<ul style="list-style-type: none"> <li>No information to-date</li> </ul>
Chile	<ul style="list-style-type: none"> <li>No information to-date</li> </ul>
Colombia	<ul style="list-style-type: none"> <li>Approval request and Environment Licensing (import licensing);</li> <li>Regulation of Protection and Control of Air Quality (Decree 948, June 5, 1995) (maximum permissible limits of HFC emissions)</li> <li>Served as host of the 2012 UNEP conference "Near-Term Climate Protection and Clean Air for Latin America and the Caribbean" to address SLCPs at the regional level</li> </ul>
Cote d'Ivoire	<ul style="list-style-type: none"> <li>No information to-date</li> </ul>
Denmark	<ul style="list-style-type: none"> <li>Ministry of the Environment's Statutory Order No. 552 of 2 July 2002 on the regulation of certain industrial greenhouse gases (Prohibition/Authorization on the import, sale, and use of new products containing HFCs)</li> <li>Consolidated Act No. 208 of 22 March 2001 on a tax on certain ozone layer-depleting substances and greenhouse gases</li> </ul>
Dominican Republic	<ul style="list-style-type: none"> <li>No information to-date</li> </ul>
Ethiopia	<ul style="list-style-type: none"> <li>No information to-date</li> </ul>
Finland	<ul style="list-style-type: none"> <li>No information to-date</li> </ul>
France	<ul style="list-style-type: none"> <li>The French Ministry for the Environment is considering introducing a tax on HFCs with a GWP greater than 150</li> </ul>
Germany	<ul style="list-style-type: none"> <li>Chemicals Climate Protection Ordinance (Chemikalien Klimaschutz Verordnung) Regulation on the protection of the climate changes caused by the entry of certain fluorinated greenhouse gases (leakage limit restrictions for stationary applications)</li> </ul>
Ghana	<ul style="list-style-type: none"> <li>No information to-date</li> </ul>
Ireland	<ul style="list-style-type: none"> <li>No information to date</li> </ul>
Israel	<ul style="list-style-type: none"> <li>No information to-date</li> </ul>
Italy	<ul style="list-style-type: none"> <li>National Register of Certified Persons and Companies ("Registro telematico delle Persone e delle Imprese Certificate") (includes certification and registration requirements)</li> <li>Report on Fluorinated Greenhouse Gas Emissions ("Dichiarazione sulle emissioni in atmosfera dei gas fluorurati ad effetto serra") (reporting requirement)</li> </ul>
Japan	<ul style="list-style-type: none"> <li>Home Appliance Recycling Law</li> <li>Fluorocarbons Recovery and Destruction Law</li> <li>End-of-Life Vehicle Law</li> </ul>
Jordan	<ul style="list-style-type: none"> <li>No information to-date</li> </ul>
Mexico	<ul style="list-style-type: none"> <li>Voluntary action to mitigate HFC emissions through the Domestic refrigerator NAMA (National Appropriated Mitigation Actions)</li> </ul>
Netherlands	<ul style="list-style-type: none"> <li>The Netherlands' Climate Policy Implementation Plan, Part I: Measures in the Netherlands (required practices to limit emissions; subsidies for promoting low-GWP alternatives)</li> <li>Dutch Regulation for Containment of Refrigerant Gases (certifications and other refrigerant handling requirements)</li> </ul>
New Zealand	<ul style="list-style-type: none"> <li>New Zealand Emissions Trading Scheme and its amendments</li> <li>Climate Change (Synthetic GHG Levies) Regulations 2013</li> </ul>

CCAC Partner	HFC Policies, HFC Initiatives
	<ul style="list-style-type: none"> <li>Climate Change Response Act 2002 (CCRA) (ban on the willful release of HFCs)</li> </ul>
Nigeria	<ul style="list-style-type: none"> <li>No information to-date</li> </ul>
Norway	<ul style="list-style-type: none"> <li>Excise Duty on Hydrofluorocarbons (HFCs) and Perfluorocarbons (PFCs) 2012</li> <li>Hydrofluorocarbon (HFC) and Perfluorocarbon (PFC) Tax</li> </ul>
Peru	<ul style="list-style-type: none"> <li>No information to-date</li> </ul>
Poland	<ul style="list-style-type: none"> <li>Emission Fees, POM Fees and Reporting/Recordkeeping Requirements</li> </ul>
Republic of Korea	<ul style="list-style-type: none"> <li>No information to-date</li> </ul>
Republic of Maldives	<ul style="list-style-type: none"> <li>No policy to-date; however, the Maldivian Ministry of Environment and Energy is making efforts to promote non-HFC based equipment</li> </ul>
Sweden	<ul style="list-style-type: none"> <li>Refrigerant charge restrictions</li> <li>Ordinance on refrigeration and heat pump systems containing CFC, other CFCs, halons, HCFCs, and HFCs (SNF 1992:16) [With amending regulations SNFS 1993: 2, 1993:8, 1994:5, and 1997:3 and NFS 2003:11] (required recycling, reclamation, or destruction practices)</li> <li>The Swedish Ministry of Finance published a proposal on introducing a tax on HFCs</li> </ul>
Switzerland	<ul style="list-style-type: none"> <li>Swiss F-gas regulations (prescribes the use of certain indirect refrigeration systems for supermarket refrigeration systems and bans HFCs in a series of applications)</li> </ul>
United Kingdom	<ul style="list-style-type: none"> <li>Fluorinated Greenhouse Gas Regulations 2009 (effectively identical to the EU F-Gas Regulations but details certain UK specific issues such as approved training courses, offences and penalties for non-compliance)</li> </ul>
United States	<ul style="list-style-type: none"> <li>Section 608 Requirements: Venting Prohibition/Authorization</li> <li>Section 609 Requirements: Motor Vehicle Air Conditioning</li> <li>Greenhouse Gas Reporting Program (40 CFR Part 98)</li> <li>2012 to 2016 Model Years Light-Duty Vehicle GHG Emissions and Corporate Average Fuel Economy Standards</li> <li>2017 and Later Model Years Light-Duty Vehicle GHG Emissions and Corporate Average Fuel Economy Standards</li> <li>Greenhouse Gas Emissions Standards and Fuel Efficiency Standards for Medium- and Heavy-Duty Engines and Vehicles</li> <li><b>Significant New Alternatives Policy (SNAP) Program</b></li> <li>Stationary Equipment Management Program Regulation for Non-Residential Refrigeration Systems (California only)</li> <li>HFC Emission Reduction Measures for Mobile Air Conditioning (California only)</li> <li>HFC Emission Reduction Measures for Mobile Air Conditioning - Low Emission Vehicle (LEV III), MAC Effort (California only)</li> <li>Greenchill Partnership</li> <li>Responsible Appliance Disposal (RAD) Program</li> <li>Proposed Section 608 Sales Restriction</li> <li>Proposed measures on new supermarket refrigeration system design and installation leak-tight measures to Title 24 (California Building Code), Part 11, "Green Building Standards" (California only)</li> <li>Proposed MAC HFC Reductions (California only)</li> <li>Climate Action Plan</li> </ul>
European Union	<ul style="list-style-type: none"> <li>"MAC Directive" – Emissions from air conditioning systems in motor vehicles</li> <li>Regulation (EC) No 842/2006 of the European Parliament and of the Council of 17 May 2006 on certain fluorinated greenhouse gases</li> <li>Effort Sharing Decision and Commission Decision on determining Member States' annual emission allocations for the period from 2013 to 2020 pursuant to Decision No 406/2009/EC</li> <li>Directive 2003/87/EC of the European Parliament and of the Council of 13 October 2003 establishing a system for greenhouse gas emission allowance trading within the Community</li> <li>Directive 2008/1/EC of the European Parliament and of the Council concerning integrated pollution prevention and control (the IPPC Directive)</li> </ul>

<sup>a</sup> The Australian Government has drafted legislation that proposes abolishing the levy starting 1 July 2014.

### 3. Existing HFC Policies

#### Africa



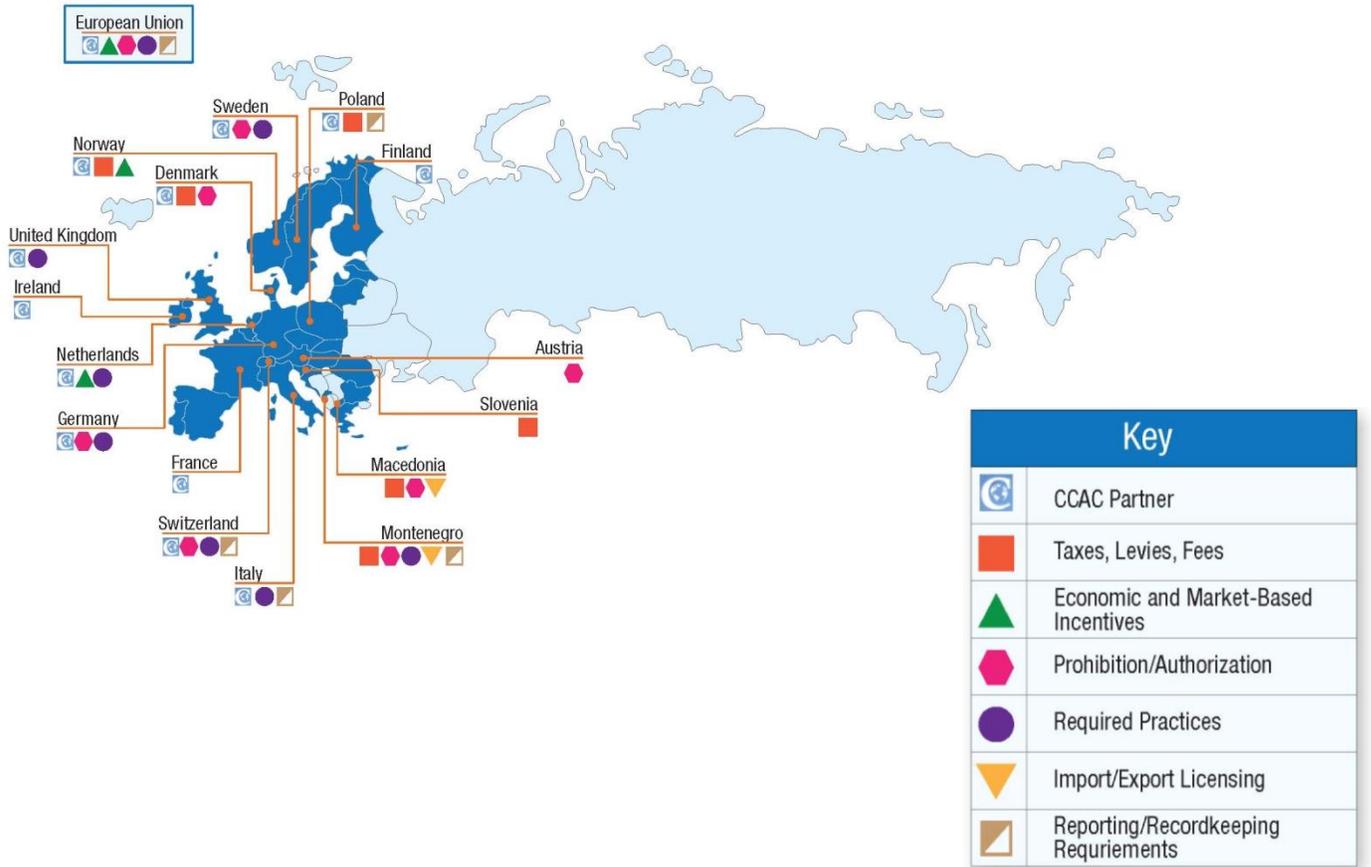
#### Burkina Faso

<b>Name of Policy</b>	HFC authorization and import tax
<b>Governing Body</b>	Ministry of Environment
<b>National Contact Office</b>	National Ozone Unit
<b>Date of Implementation</b>	
<b>Type of Policy</b>	
<input checked="" type="checkbox"/> Taxes, Levies, and Other Types of Fees	<input type="checkbox"/> Required Practices
<input type="checkbox"/> Economic and Market-Based Incentives	<input checked="" type="checkbox"/> Import/Export Licensing
<input type="checkbox"/> Prohibition/Authorization	<input type="checkbox"/> Reporting/Recordkeeping Requirements
<b>Overview</b>	
<p>HFCs are considered a controlled product in Burkina Faso and importers are required to submit an authorization to the ozone office of the Ministry of the Environment for review. If the importation is approved, the import is then considered by the customs office and will be taxed according to the context in which the product is introduced to the country. Taxes may be waived if there are multilateral or bilateral agreements in place between Burkina Faso and another country. For HFCs, the full taxation amount is between 27 and 30 percent of the total value of the imported goods.</p> <p>At the end of each year, the National Ozone Unit and the ministry in charge of trade harmonize their HFC import records.</p>	
<b>Resources</b>	
<i>(The information above was reviewed or provided by the government.)</i>	

## Egypt

<b>Name of Policy</b>	Record of Imports of HFCs
<b>Governing Body</b>	Egyptian Environmental Affairs Agency/Egyptian Customs Authority/Egyptian Authority for Imports and exports monitoring
<b>National Contact Office</b>	National Ozone Unit
<b>Date of Implementation</b>	October 2000
<b>Type of Policy</b>	
<input type="checkbox"/> Taxes, Levies, and Other Types of Fees	<input type="checkbox"/> Required Practices
<input type="checkbox"/> Economic and Market-Based Incentives	<input type="checkbox"/> Import/Export Licensing
<input type="checkbox"/> Prohibition/Authorization	<input checked="" type="checkbox"/> Reporting/Recordkeeping Requirements
<b>Overview</b>	
<p>In October 2000, her Excellency Minister of State for Environmental Affairs issued a ministerial decree to monitor the importation of controlled substances and products, including HFCs. This decree requested the customs authority to demand a letter from the Egyptian Environmental Affairs Agency (EEAA) before clearing any imported shipment with HFCs from customs. When the importer applies for this letter from EEAA, the imported HFCs are registered in the database. Consequently, imported HFCs and other refrigerants are monitored and registered when imported to Egypt. Starting from January 2011, the Egyptian Authority for Imports and exports monitoring is authorized to technically inspect and analyze imports of controlled substances, on behalf of EEAA.</p>	
<b>Resources</b>	
<i>(The information above was reviewed or provided by the government.)</i>	

## Europe and Central Asia



## Austria

<b>Name of Policy</b>	Austria F-gas Regulation (BGBl. II Nr. 447/2002, with Amendments from BGBl. II Nr. 86/2006 and Nr. 139/2007)
<b>Governing Body</b>	Minister of Agriculture, Forestry, Environment, and Water
<b>National Contact Office</b>	
<b>Date of Implementation</b>	2002
<b>Type of Policy</b>	
<input type="checkbox"/> Taxes, Levies, and Other Types of Fees	<input type="checkbox"/> Required Practices
<input type="checkbox"/> Economic and Market-Based Incentives	<input type="checkbox"/> Import/Export Licensing
<input checked="" type="checkbox"/> Prohibition/Authorization	<input type="checkbox"/> Reporting/Recordkeeping Requirements
<b>Overview</b>	
<p>Austria has put in place regulations that prohibit the import and use of HFCs in devices, systems, and products. Starting from 2008, the use of HFCs for new fixed air conditioners and freezers, including domestic refrigerators, freezers, and mobile air conditioners, are prohibited. The continued use of HFCs in refrigeration appliances for high-performance servers, computer rooms (regardless of refrigerant capacity), and cooling devices with a refrigerant charge between 150 g and 20 kg or not exceeding 1.5 kg/kW cooling capacity has been extended until further notice.</p> <p>In addition, HFCs have been banned in non-medical aerosol products and as solvents (except when used in closed systems) since July 1, 2003 and the use of HFCs as an extinguishing agent for fire protection systems is prohibited. As of December 31, 2007, the use of HFCs for the production of foams has been prohibited.</p>	
<b>Resources</b>	
<ul style="list-style-type: none"> <li>• Austrian Minister of Agriculture, Forestry, Environment, and Water. 2002. 447<sup>th</sup> Regulation: Prohibition/Authorizations and restrictions of partially and fully fluorinated hydrocarbons and sulfur hexafluoride (HFCs, and SF6). Nr. 447/2002. Available at: <a href="http://www.ris.bka.gv.at/Dokumente/BgblPdf/2002_447_2/2002_447_2.pdf">http://www.ris.bka.gv.at/Dokumente/BgblPdf/2002_447_2/2002_447_2.pdf</a> Accessed May 2013.</li> <li>• Austrian Minister of Agriculture, Forestry, Environment, and Water. 2007. Amendment to the Regulation on bans and restrictions of partially and fully fluorinated hydrocarbons and sulfur hexafluoride (HFCs, and SF6). Nr. 139/2007. Available at: <a href="http://www.ris.bka.gv.at/Dokumente/BgblAuth/BGBLA_2007_II_139/BGBLA_2007_II_139.pdf">http://www.ris.bka.gv.at/Dokumente/BgblAuth/BGBLA_2007_II_139/BGBLA_2007_II_139.pdf</a> Accessed April 2013.</li> </ul>	

## Denmark

<b>Name of Policy</b>	Ministry of the Environment's Statutory Order No. 552 of 2 July 2002 on the regulation of certain industrial greenhouse gases (HFCs, PFCs and SF <sub>6</sub> )
<b>Governing Body</b>	Denmark Ministry of the Environment
<b>National Contact Office</b>	Environmental Protection Agency
<b>Date of Implementation</b>	July 2002
<b>Type of Policy</b>	
<input type="checkbox"/> Taxes, Levies, and Other Types of Fees <input type="checkbox"/> Economic and Market-Based Incentives <input checked="" type="checkbox"/> Prohibition/Authorization	<input type="checkbox"/> Required Practices <input type="checkbox"/> Import/Export Licensing <input type="checkbox"/> Reporting/Recordkeeping Requirements
<b>Overview</b>	
<p>The import, sale, and use of new products containing HFCs and the import, sale, and use of new and recycled HFCs have been prohibited since January 2006. The ban does not apply to the import, manufacture, and sale of products exclusively for export. The following new products are exempt from the restrictions on HFC equipment:</p> <ul style="list-style-type: none"> <li>• Cooling systems, heat pumps, air conditioning (comfort cooling), and dehumidifiers with charges between 0.15 kg and 10 kg</li> <li>• Cooling systems for heat recovery with a charge less than or equal to 50 kg</li> <li>• Vaccine coolers</li> <li>• Mobile refrigerators</li> <li>• Air conditioning in vehicles and aircraft</li> <li>• Low temperature freezer (temperatures below 50 °C)</li> <li>• Medical aerosols</li> <li>• Test facilities for testing of cooling equipment</li> <li>• Auto (thermostats, valves, etc.)</li> <li>• Products for military use</li> <li>• Products for use on board ships</li> </ul> <p>Additionally, the following uses of HFCs are exempt from the regulation:</p> <ul style="list-style-type: none"> <li>• Servicing of refrigeration, air conditioners, heat pumps, dehumidifiers</li> <li>• Servicing of air conditioners in vehicles and aircraft</li> <li>• Servicing of laboratory equipment</li> <li>• Military use</li> <li>• Use on board ships</li> </ul>	
<b>Resources</b>	
<ul style="list-style-type: none"> <li>• Denmark Ministry of the Environment. 2005. The Danish Environmental Protection Agency's guidance for applications for exemption from the ban on the use of industrial greenhouse gases (HFCs, PFCs, and SF<sub>6</sub> (F-gases)). Available at: <a href="http://www.mst.dk/English/Chemicals/legislation_on_chemicals/danish_legislation_specific_substances/industrial_green_house_gases/guidance_exemption.htm">http://www.mst.dk/English/Chemicals/legislation_on_chemicals/danish_legislation_specific_substances/industrial_green_house_gases/guidance_exemption.htm</a>. Accessed April 2013.</li> <li>• Denmark Ministry of the Environment. 2002. Order on regulation of certain industrial greenhouse gases. Order No. 552 of 02/07/2002. Available at: <a href="https://www.retsinformation.dk/Forms/R0710.aspx?id=12578">https://www.retsinformation.dk/Forms/R0710.aspx?id=12578</a>. Accessed April 2013.</li> </ul> <p><i>(The information above was reviewed or provided by the government.)</i></p>	

<b>Country</b>	Denmark	
<b>Name of Policy</b>	Consolidated Act No. 208 of 22 March 2001 on a tax on certain ozone layer-depleting substances and greenhouse gases (Tax on chlorofluorocarbons, halons, hydrofluorocarbons, perfluorocarbons and sulfur hexafluoride) as subsequently amended in Consolidated Act No. 522 of 12/06/2009	
<b>Governing Body</b>	Denmark Ministry of Taxation	
<b>National Contact Office</b>		
<b>Date of Implementation</b>	1 July 2001	
<b>Type of Policy</b>		
<input checked="" type="checkbox"/> Taxes, Levies, and Other Types of Fees	<input type="checkbox"/> Required Practices	
<input type="checkbox"/> Economic and Market-Based Incentives	<input type="checkbox"/> Import/Export Licensing	
<input type="checkbox"/> Prohibition/Authorization	<input type="checkbox"/> Reporting/Recordkeeping Requirements	
<b>Overview</b>		
Beginning July 1, 2001, any person who professionally manufactures or receives HFCs from abroad (whether neat or present in mixtures with other substances or contained in products or articles) must pay a tax to the Treasury. The taxes for each HFC were updated in a 2009 amendment to the regulation.		
	<b>Substance</b>	<b>Tax<sup>a</sup></b>
	HFC-23 (R-23)	600 kr/kg (USD 92.14/kg)
	HFC-32 (R-32)	101 kr/kg (USD 15.51/kg)
	HFC-41 (R-41)	15 kr/kg (USD 2.30 /kg)
	HFC-43-10mee (R-43-10mee)	246 kr/kg (USD 37.72/kg)
	HFC-125 (R-125)	525 kr/kg (USD 80.49/kg)
	HFC-134 (R-134)	165 kr/kg (USD 25.30/kg)
	HFC-134a (R-134a)	215 kr/kg (USD 33.02 per share/kg)
	HFC-143 (R-143)	50 kr/kg (USD 7.68/kg)
	HFC-143a (R-143a)	600 kr/kg (USD 92.14/kg)
	HFC-152a (R-152a)	19 kr/kg (USD 2.91/kg)
	HFC-227a (R-227)	483 kr/kg (USD 74.05/kg)
	HFC-236fa (R-236-fa)	600 kr/kg (USD 92.14/kg)
	HFC-245ca (R-245ca)	96 kr/kg (USD 14.72/kg)
	HFC-245fa (R-245fa)	155 kr/kg (USD 23.80/kg)
	HFC-365mfc (R-365mfc)	119 kr/kg (USD 18.28/kg)
	R-404A (HFC-143a/HFC-125/134a)	588 kr/kg (USD 90.15/kg)
	R-407C (HFC-32/HFC-125/134a)	266 kr/kg (USD 40.78/kg)
	R-410A (HFC-32/HFC-125)	313 kr/kg (USD 55.42/kg)
	R-413A (134a/PFC-218/HC-600a)	308 kr/kg (USD 47.22/kg)
	R-507 (HFC-125/HFC-143a)	598 kr/kg (USD 91.69/kg)
	R-508A (HFC-23/PFC-116)	600 kr/kg(USD 92.14/kg)
	R-508b (HFC-23/PFC-116)	600 kr/kg (USD 92.14/kg)
<b>Resources</b>		
<ul style="list-style-type: none"> <li>Danish Ministry of the Environment. 2001. Announcement of the law on tax on certain ozone-depleting substances and certain greenhouse gases (tax on chlorofluorocarbons, halons, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride). Consolidated Act No. 208 of 22/03/2001. Available at: <a href="https://www.retsinformation.dk/Forms/R0710.aspx?id=14914">https://www.retsinformation.dk/Forms/R0710.aspx?id=14914</a></li> <li>Danish Ministry of the Environment. 2001. Law amending the Law on the taxation of wastewater and various other Acts. Act No. 522 of 12/06/2009. Available at: <a href="https://www.retsinformation.dk/forms/R0710.aspx?id=125356&amp;exp=1">https://www.retsinformation.dk/forms/R0710.aspx?id=125356&amp;exp=1</a></li> </ul> <p><i>(The information above was reviewed or provided by the government.)</i></p>		

<sup>a</sup> Taxes expressed in Danish Krone (DKK) and USD. The exchange rate applied is 1 DKK dollar = 0.18 USD (August 2013).

## European Union

<b>Name of Policy</b>	“MAC Directive” – Emissions from air conditioning systems in motor vehicles (2006/40 EC and 2007/37/EC)
<b>Governing Body</b>	European Commission
<b>National Contact Office</b>	Directorate-General for Enterprise and Industry
<b>Date of Implementation</b>	June 2008
<b>Type of Policy</b>	
<input type="checkbox"/> Taxes, Levies, and Other Types of Fees	<input type="checkbox"/> Required Practices
<input type="checkbox"/> Economic and Market-Based Incentives	<input type="checkbox"/> Import/Export Licensing
<input checked="" type="checkbox"/> Prohibition/Authorization	<input type="checkbox"/> Reporting/Recordkeeping Requirements
<b>Overview</b>	
<p>The main objectives of the Directive are to control the leakage of HFCs and other fluorinated greenhouse gases with a GWP higher than 150 in MACs and prohibit MACs using those gases after a certain date.</p> <p>Since January 1, 2011, the use of HFCs with a GWP higher than 150 has not been permitted in MACs within new types of vehicles. Manufacturers are unable to obtain EC or national type-approval for registration, sale, or entry into service for a new type of vehicle if it is fitted with these kinds of systems. However, due to some exceptional circumstances related to the supply of HFO-1234yf, the refrigerant designated as the technical solution to comply with the Directive’s targets, the European Commission refrained from launching infringement procedures on production of vehicles using HFCs with a GWP higher than 150 until December 31, 2012. This exception has not been extended, as the supply issues with HFO-1234yf have been resolved.</p> <p>This ban enters into effect January 1, 2017 for all other new vehicles. From January 1, 2017 onwards, new vehicles with these systems cannot be registered, sold, or entered into service.</p>	
<b>Resources</b>	
<ul style="list-style-type: none"> <li>• European Commission. 2014. The European Directive on mobile air-conditioning systems (MACs) aims at reducing emissions of specific fluorinated greenhouse gases in the air-conditioning systems fitted to passenger cars (vehicles of category M1) and light commercial vehicles (category N1, class 1). Available at: <a href="http://ec.europa.eu/enterprise/sectors/automotive/environment/macs/index_en.htm">http://ec.europa.eu/enterprise/sectors/automotive/environment/macs/index_en.htm</a>. Accessed January 2014.</li> <li>• European Commission. 2007. Emissions from air conditioning systems in motor vehicles. Directive 2006/40/EC. Available at: <a href="http://ec.europa.eu/enterprise/sectors/automotive/documents/directives/directive-2006-40-ec_en.htm">http://ec.europa.eu/enterprise/sectors/automotive/documents/directives/directive-2006-40-ec_en.htm</a></li> </ul> <p><i>(The information above was reviewed or provided by the government.)</i></p>	

<b>Region</b>	European Union
<b>Name of Policy</b>	Regulation (EC) No 842/2006 of the European Parliament and of the Council of 17 May 2006 on certain fluorinated greenhouse gases
<b>Governing Body</b>	European Commission
<b>National Contact Office</b>	Directorate-General for Climate Action (DG CLIMA)
<b>Date of Implementation</b>	July 2007
<b>Type of Policy</b>	
<input type="checkbox"/> Taxes, Levies, and Other Types of Fees	<input checked="" type="checkbox"/> Required Practices
<input type="checkbox"/> Economic and Market-Based Incentives	<input type="checkbox"/> Import/Export Licensing
<input checked="" type="checkbox"/> Prohibition/Authorization	<input checked="" type="checkbox"/> Reporting/Recordkeeping Requirements
<b>Overview</b>	
<p>The EC F-Gas Regulation aims to reduce emissions of HFCs; it is estimated that this regulation will result in a 50% emission reduction by 2050 (compared to a scenario without F-gas reduction measures). The EC F-Gas Regulation encompasses the following emission reduction features:</p> <ul style="list-style-type: none"> <li>• Containment is a governing obligation to use all measures that are technically feasible and do not entail disproportionate cost to prevent leakage and repair any detected leakage;</li> <li>• Inspection by certified personnel, annually for systems with 3 kg or more, more frequently for larger systems, less frequently for hermetically sealed systems;</li> <li>• Automatic leakage detection systems for equipment with charges over 300 kg;</li> <li>• Record keeping of HFCs and other F-Gases installed, added or recovered during maintenance, servicing and final disposal;</li> <li>• Recovery of HFCs and other F-Gases at end of life by certified personnel for stationary equipment. For mobile equipment only to the extent that it is technically feasible and does not entail disproportionate cost;</li> <li>• Labeling of equipment containing HFCs or other F-Gases identifying the working gas used in the equipment;</li> <li>• Training and certification program requirements, as well as identifying personnel that have to be trained;</li> <li>• Reporting obligations for importers, exporters and producers; and</li> <li>• Placing on the market bans for non-refillable containers (2007), direct evaporation systems (2007), windows (2007/8), footwear (2006), tires (2007), one component foams (2008), novelty aerosols (2009).</li> </ul> <p>A revision to the regulation was proposed on November 7, 2012 and includes a phase-down to gradually decline the cap on total placement of HFCs in the EU market, with a freeze in 2015, followed by a reduction in 2016, and reaching 21% of the levels sold in 2008–11 by 2030. In addition, the following bans on new equipment containing HFCs are proposed:</p> <ul style="list-style-type: none"> <li>• Use of HFC-23 in fire protection systems and fire extinguishers after January 1, 2015;</li> <li>• Domestic refrigerators and freezers with HFCs with a GWP of 150 or more after January 1, 2015;</li> <li>• Hermetically sealed refrigerators and freezers for commercial use after January 1, 2017 for HFCs with GWP of 2,500 or more and after January 1, 2020 for HFCs with GWP of 150 or more; and</li> <li>• Hermetically sealed movable room air-conditioning appliances with HFCs with GWP of 150 or more after January 1, 2020.</li> </ul> <p>In December 2013, representatives of the European Parliament and Council agreed on slightly amended text based on the Commission's proposal. The revision of the Regulation is now subject to the formal approval of the Parliament and Council.</p> <p>Recharging of existing refrigeration equipment with a charge size over 5 metric tons of CO<sub>2</sub> equivalent with HFC of GWP higher than 2,500 is not permitted after 2020.</p>	
<b>Resources</b>	
<ul style="list-style-type: none"> <li>• European Commission. 2012. EU legislation to control F-gases. 6 November 2012. Available at: <a href="http://ec.europa.eu/clima/policies/f-gas/legislation/index_en.htm">http://ec.europa.eu/clima/policies/f-gas/legislation/index_en.htm</a>. Accessed April 2013.</li> <li>• European Commission. 2012. Proposal for a Regulation of the European Parliament and of the Council on fluorinated greenhouse gases 2012/0305 (COD). 7 November 2012. Available at: <a href="http://ec.europa.eu/clima/policies/f-gas/legislation/docs/com_2012_643_en.pdf">http://ec.europa.eu/clima/policies/f-gas/legislation/docs/com_2012_643_en.pdf</a>. Accessed April 2013.</li> <li>• European Commission. 2006. Regulation (EC) No 842/2006 of the European Parliament and of the Council of 17 May 2006 on certain fluorinated greenhouse gases. Available at: <a href="http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2006:161:0001:0011:EN:PDF">http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2006:161:0001:0011:EN:PDF</a>. Accessed April 2013.</li> </ul> <p><i>(The information above was reviewed or provided by the government.)</i></p>	

<b>Region</b>	European Union
<b>Name of Policy</b>	Directive 2003/87/EC of the European Parliament and of the Council of 13 October 2003 establishing a system for greenhouse gas emission allowance trading within the Community
<b>Governing Body</b>	European Commission
<b>National Contact Office</b>	Directorate-General for Climate Action (DG CLIMA)
<b>Date of Implementation</b>	2003
<b>Type of Policy</b>	
<input type="checkbox"/> Taxes, Levies, and Other Types of Fees <input checked="" type="checkbox"/> Economic and Market-Based Incentives <input type="checkbox"/> Prohibition/Authorization <input checked="" type="checkbox"/> Required Practices <input type="checkbox"/> Import/Export Licensing <input checked="" type="checkbox"/> Reporting/Recordkeeping Requirements	
<b>Overview</b>	
<p>This Directive introduces significant reductions in HFCs (as well as other greenhouse gas emissions including CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O, PFCs, and SF<sub>6</sub>).</p> <p>Since January 1, 2005, all installations carrying out activities in the energy sector, iron and steel production and processing, mineral industry, and the wood pulp, paper, and board industry resulting in greenhouse gas emissions must be in possession of an appropriate permit. Applications for permits must describe the:</p> <ul style="list-style-type: none"> <li>• Installation, its activities and the technology used;</li> <li>• Materials used which could emit HFCs (and other greenhouse gases listed in Annex II);</li> <li>• Sources of gas emissions; and</li> <li>• Measures planned to monitor and report emissions.</li> </ul> <p>In addition, a Community-wide quantity of HFCs will be issued each year, and will decrease in a linear manner from 2013. For 2013, the absolute Community-wide quantity of HFC allowances shall be calculated on the basis of the national plans accepted by the Commission and introduced between 2008 and 2012. Member States can auction all allowances which are not allocated free of charge. The distribution of allowances by auction shall take place according to the following procedures:</p> <ul style="list-style-type: none"> <li>• 88 percent shall be distributed amongst Member States on the basis of their emissions;</li> <li>• 10 percent shall be distributed for the purpose of solidarity and growth;</li> <li>• 2 percent shall be distributed amongst Member States the greenhouse gas emissions of which were, in 2005, at least 20 percent below their emissions in the base year applicable to them under the UNFCCC and its Kyoto Protocol.</li> </ul> <p>Member States are also required to monitor and report emissions.</p>	
<b>Resources</b>	
<ul style="list-style-type: none"> <li>• European Commission. Directive 2003/87/EC of the European Parliament and of the Council of 13 October 2003 establishing a scheme for greenhouse gas emissions allowance trading within the Community and amending Council Directive 96/61/EC. Available at: <a href="http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:32003L0087:EN:NOT">http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:32003L0087:EN:NOT</a>. Accessed April 2013.</li> <li>• European Commission. Greenhouse gas emission allowance trading scheme. Available: <a href="http://europa.eu/legislation_summaries/environment/tackling_climate_change/128012_en.htm#amendingact">http://europa.eu/legislation_summaries/environment/tackling_climate_change/128012_en.htm#amendingact</a>. Accessed April 2013.</li> </ul> <p><i>(The information above was reviewed or provided by the government.)</i></p>	

<b>Region</b>	European Union
<b>Name of Policy</b>	Directive 2008/1/EC of the European Parliament and of the Council concerning integrated pollution prevention and control (the IPPC Directive)
<b>Governing Body</b>	European Commission
<b>National Contact Office</b>	European IPPC Bureau (EIPCCB)
<b>Date of Implementation</b>	1996
<b>Type of Policy</b>	
<input type="checkbox"/> Taxes, Levies, and Other Types of Fees	<input checked="" type="checkbox"/> Required Practices
<input type="checkbox"/> Economic and Market-Based Incentives	<input type="checkbox"/> Import/Export Licensing
<input checked="" type="checkbox"/> Prohibition/Authorization	<input type="checkbox"/> Reporting/Recordkeeping Requirements
<b>Overview</b>	
<p>In 1996, the EU adopted a set of common rules for permitting and controlling industrial installations in the IPPC Directive (Directive 96/61/EC), which was recently codified (Directive 2008/1/EC). The purpose of the IPPC Directive is to minimize pollution from various industrial sources throughout the EU. Polluting substances that are covered include fluorine and HFCs. Operators of industrial installations are required to obtain an environmental permit from the authorities in the EU countries. The IPPC Directive is based on four principles:</p> <ul style="list-style-type: none"> <li>• Permits must take into account the whole environmental performance of the plant, covering emissions to air, water and land; generation of waste; use of raw materials; energy efficiency; etc.</li> <li>• The permit requires an emission limit value based on best available techniques for the plant.</li> <li>• The IPPC Directive is flexible to take into account technical characteristics, location, and local environmental conditions.</li> <li>• The Directive ensures that the public has a right to participate in the decision making process through sharing results of the monitoring of releases and access to permits and permit applications.</li> </ul>	
<b>Resources</b>	
<ul style="list-style-type: none"> <li>• European Commission. Summary of Directive 2008/1/EC concerning integrated pollution prevention and control (the IPPC Directive). Available at: <a href="http://ec.europa.eu/environment/air/pollutants/stationary/ippc/summary.htm">http://ec.europa.eu/environment/air/pollutants/stationary/ippc/summary.htm</a>. Accessed April 2013.</li> <li>• European Commission. Directive 2008/1/EC of the European Parliament and of the Council of 15 January 2008 concerning integrated pollution preventing and control (codified version). Available: <a href="http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2008:024:0008:0029:en:PDF">http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2008:024:0008:0029:en:PDF</a></li> </ul> <p><i>(The information above was reviewed or provided by the government.)</i></p>	

<b>Region</b>	European Union
<b>Name of Policy</b>	Effort Sharing Decision and Commission Decision on determining Member States' annual emission allocations for the period from 2013 to 2020 pursuant to Decision No 406/2009/EC
<b>Governing Body</b>	European Commission
<b>National Contact Office</b>	Directorate-General for Climate Action (DG CLIMA)
<b>Date of Implementation</b>	2013
<b>Type of Policy</b>	
<input type="checkbox"/> Taxes, Levies, and Other Types of Fees	<input type="checkbox"/> Required Practices
<input type="checkbox"/> Economic and Market-Based Incentives	<input type="checkbox"/> Import/Export Licensing
<input checked="" type="checkbox"/> Prohibition/Authorization	<input type="checkbox"/> Reporting/Recordkeeping Requirements
<b>Overview</b>	
<p>The Effort Sharing Decision covers the six greenhouse gases controlled by the UNFCCC's Kyoto Protocol, which includes HFCs.</p> <p>The Effort Sharing Decision establishes binding annual emission targets from 2013 through 2020, based on a 2005 baseline. The national emission targets for 2020 for each Member State were determined relative to each Member State's Gross Domestic Product per capita. The emission targets range from a 20 percent emission reduction for the wealthiest Member States to a 20 percent increase for the least wealthy. By 2020, the national targets will collectively deliver a reduction of around 10 percent in total EU emissions from the sectors covered compared with 2005 levels.</p> <p>These targets concern emissions from most sectors not included in the EU Emissions Trading System, such as transport (except aviation), buildings, agriculture, and waste. Each Member State is responsible for defining and implementing policies to achieve these emission targets.</p>	
<b>Resources</b>	
<ul style="list-style-type: none"> <li>• European Commission. Effort Sharing Decision. Available at: <a href="http://ec.europa.eu/clima/policies/effort/index_en.htm">http://ec.europa.eu/clima/policies/effort/index_en.htm</a>. Accessed April 2013.</li> <li>• European Commission. Commission Decision of 26 March 2013 on determining Member States' annual emission allocations for the period from 2013 to 2020 pursuant to Decision No 406/2009/EC of the European Parliament. Available at: <a href="http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:32013D0162:EN:NOT">http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:32013D0162:EN:NOT</a>. Accessed May 2013.</li> </ul> <p><i>(The information above was reviewed or provided by the government.)</i></p>	

## Germany

<b>Name of Policy</b>	Chemicals Climate Protection Ordinance (Chemikalien Klimaschutz Verordnung) [Regulation on the protection of the climate changes caused by the entry of certain fluorinated greenhouse gases]		
<b>Governing Body</b>	Federal Environment Ministry		
<b>National Contact Office</b>	Division IG II 1, Bonn		
<b>Date of Implementation</b>	August 1, 2008		
<b>Type of Policy</b>			
<input type="checkbox"/> Taxes, Levies, and Other Types of Fees	<input checked="" type="checkbox"/> Required Practices		
<input type="checkbox"/> Economic and Market-Based Incentives	<input type="checkbox"/> Import/Export Licensing		
<input checked="" type="checkbox"/> Prohibition/Authorization	<input type="checkbox"/> Reporting/Recordkeeping Requirements		
<b>Overview</b>			
This regulation applies in addition to the Regulation (EC) No 842/2006 on certain fluorinated greenhouse gases, which includes all HFCs. Any stationary applications (defined in Article 3, paragraph 1 of Regulation No 842/2006) are subject to the following leakage limits:			
	<b>Application</b>	<b>Refrigerant Charge</b>	<b>Leakage Limit (%)</b>
	Cold blocks	≥ 3kg	1
	On-site built applications (after June 30, 2008)	< 10kg	3
		10 to 100 kg	2
		>100 kg	1
	On-site built applications (between June 30, 2005 and June 30, 2008)	< 10kg	6
		10 to 100 kg	4
		> 100kg	1
	On-site built applications (before June 30, 2005)	< 10kg	8
		to 100 kg	6
		> 100kg	4
For certain types of transport refrigeration equipment annual leakage controls are required.			
<b>Resources</b>			
<ul style="list-style-type: none"> <li>Germany Federal Ministry of Environment, Nature Conservation and Nuclear Safety. 2008. Regulation on the protection of the climate changes caused by the entry of certain fluorinated greenhouse gases (Chemikalien Klimaschutz Verordnung). Last amended 2/24/2012. Available at: <a href="http://www.gesetze-im-internet.de/chemklimaschutzv/BJNR113900008.html">http://www.gesetze-im-internet.de/chemklimaschutzv/BJNR113900008.html</a>. Accessed April 2013.</li> </ul>			
<i>(The information above was reviewed or provided by the government.)</i>			

## Italy

<b>Name of Policy</b>	National Register of Certified Persons and Companies (“Registro telematico delle Persone e delle Imprese Certificate”)
<b>Governing Body</b>	Ministry for the Environment, Land and Sea Department of Sustainable Development, Climate Change and Energy
<b>National Contact Office</b>	Division IV - Research, Environmental Innovation and Sustainable Mobility at EU and National level info.fgas@minambiente.it
<b>Date of Implementation</b>	May 5, 2012
<b>Type of Policy</b>	
<input type="checkbox"/> Taxes, Levies, and Other Types of Fees	<input checked="" type="checkbox"/> Required Practices
<input type="checkbox"/> Economic and Market-Based Incentives	<input type="checkbox"/> Import/Export Licensing
<input type="checkbox"/> Prohibition/Authorization	<input checked="" type="checkbox"/> Reporting/Recordkeeping Requirements
<b>Overview</b>	
<p>The National Register of Certified Persons and Companies was established by the Italian implementation decree 43/2012. This requires relevant persons and companies working with HFCs to obtain the necessary certifications. The Register is publicly available and provides for the list of certified persons and companies. In particular, the following persons shall register to the National Register:</p> <ul style="list-style-type: none"> <li>Persons carrying out the following activities on stationary refrigeration, air conditioning, and heat pump equipment containing HFCs (and other fluorinated GHGs): <ul style="list-style-type: none"> <li>(a) leakage checking of applications containing 3 kg or more of HFCs (or other fluorinated GHGs) and of applications containing 6 kg or more of HFCs (or other fluorinated GHGs) with hermetically sealed systems, which are labeled as such;</li> <li>(b) recovery of HFCs (or other fluorinated GHGs);</li> <li>(c) installation of HFC (or other fluorinated GHG) equipment; and</li> <li>(d) maintenance or servicing of HFC (or other fluorinated GHG) equipment.</li> </ul> </li> <li>Persons carrying out the following activities on stationary fire protection systems and fire extinguishers containing HFCs (or other fluorinated GHGs): <ul style="list-style-type: none"> <li>(a) leakage checking of applications containing 3 kg or more of HFCs (or other fluorinated GHGs);</li> <li>(b) recovery of HFCs (or other fluorinated GHGs), also with regard to fire extinguishers;</li> <li>(c) installation of HFC (or other fluorinated GHG) fire equipment; and</li> <li>(d) maintenance or servicing of HFC (or other fluorinated GHG) fire equipment.</li> </ul> </li> <li>Persons recovering certain HFCs (or other fluorinated GHGs) from high-voltage switchgear.</li> <li>Persons recovering certain HFCs (or other fluorinated GHG) based solvents from equipment.</li> <li>Persons recovering certain HFC (or other fluorinated GHGs) from air-conditioning systems in motor vehicles falling within the scope of Directive 2006/40/EC.</li> </ul> <p>The same provision is foreseen for:</p> <ul style="list-style-type: none"> <li>Companies installing, maintaining, or servicing stationary refrigeration, air conditioning, and heat pump equipment containing certain HFCs (or other fluorinated GHGs).</li> <li>Companies installing, maintaining, or servicing stationary fire protection systems and fire extinguishers containing certain HFCs (or other fluorinated GHGs).</li> <li>Companies recovering certain HFCs (or other fluorinated GHGs) from high-voltage switchgear.</li> <li>Companies recovering certain HFCs (or other fluorinated GHG) based solvents from equipment.</li> <li>Companies recovering certain HFCs (or other fluorinated GHGs) from air-conditioning systems in motor vehicles.</li> </ul>	
<b>Resources</b>	
<ul style="list-style-type: none"> <li>Italy Ministry for the Environment, Land, and Sea. 2013. Available at: <a href="http://www.minambiente.it">www.minambiente.it</a></li> <li>Italy Ministry for the Environment, Land, and Sea. F-Gas – National Register. 2013. Available at: <a href="http://www.fgas.it">www.fgas.it</a></li> <li>Institution for Protection and Environmental Research, Italy. Network of National Environmental Information System. 2013. Available at: <a href="http://www.sinanet.isprambiente.it/it/fgas">www.sinanet.isprambiente.it/it/fgas</a></li> </ul> <p>(The information above was reviewed or provided by the government.)</p>	

<b>Country</b>	Italy
<b>Name of Policy</b>	Report on Fluorinated Greenhouse Gas Emissions (“Dichiarazione sulle emissioni in atmosfera dei gas fluorurati ad effetto serra”)
<b>Governing Body</b>	Ministry for the Environment, Land and Sea Department of Sustainable Development, Climate Change and Energy
<b>National Contact Office</b>	Division IV - Research, Environmental Innovation and Sustainable Mobility at EU and National level info.fgas@minambiente.it
<b>Date of Implementation</b>	May 5, 2012
<b>Type of Policy</b>	
<input type="checkbox"/> Taxes, Levies, and Other Types of Fees	<input type="checkbox"/> Required Practices
<input type="checkbox"/> Economic and Market-Based Incentives	<input type="checkbox"/> Import/Export Licensing
<input type="checkbox"/> Prohibition/Authorization	<input checked="" type="checkbox"/> Reporting/Recordkeeping Requirements
<b>Overview</b>	
<p>In order to collect information on HFCs (and other fluorinated GHG) emissions, operators of refrigeration, air conditioning, heat pump, and fire protection equipment containing 3 kg or more of HFCs (or other fluorinated GHGs), shall submit a report to the Italian Ministry of the Environment on an annual basis. The report will be based on the information indicated in the equipment records foreseen by Regulation (EC) n. 842/2006.</p> <p>In particular, the report includes the following information:</p> <ul style="list-style-type: none"> <li>• Name, postal address, telephone number of the operator;</li> <li>• Information on quantity and type of HFC (or other fluorinated GHG) installed;</li> <li>• Quantities of HFCs (or other fluorinated gases) added;</li> <li>• Quantities of HFCs (or other fluorinated gases) recovered during maintenance or servicing and final disposal; and</li> <li>• Cause of the detected leakage.</li> </ul>	
<b>Resources</b>	
<ul style="list-style-type: none"> <li>• Italy Ministry for the Environment, Land, and Sea. 2013. Available at: <a href="http://www.minambiente.it">www.minambiente.it</a></li> <li>• Institution for Protection and Environmental Research, Italy. Network of National Environmental Information System. 2013. Available at: <a href="http://www.sinanet.isprambiente.it/it/fgas">www.sinanet.isprambiente.it/it/fgas</a></li> </ul> <p><i>(The information above was reviewed or provided by the government.)</i></p>	

**Republic of Macedonia**

<b>Name of Policy</b>	Decision on distribution of goods for export and import	
<b>Governing Body</b>	Ministry of Environment and Physical Planning	
<b>National Contact Office</b>	Ozone Unit	
<b>Date of Implementation</b>	March 18, 2013	
<b>Type of Policy Decision</b>		
<input checked="" type="checkbox"/> Taxes, Levies, and Other Types of Fees	<input type="checkbox"/> Required Practices	
<input type="checkbox"/> Economic and Market-Based Incentives	<input checked="" type="checkbox"/> Import/Export Licensing	
<input checked="" type="checkbox"/> Prohibition/Authorization	<input type="checkbox"/> Reporting/Recordkeeping Requirements	
<b>Overview</b>		
<p>According to the Decision on distribution of goods for export and import (OG of the RM no. 42/13) the HFCs and mixtures containing HFCs can be imported only with permit issued by the Ministry of Environment and Physical Planning.</p> <p>There is fee for import of used refrigerators, freezers and air-conditioners depending on the volume and capacity (OGs of the RM 53/2005, 81/2005, 24/2007, 159/2008, 83/2009, 48/10, 124/10, 51/11, 123/12).</p> <p>As of January 1, 2007 the import of used refrigerators, freezers and other cooling and freezing devices is banned.</p>		
<b>Resources</b>		
<ul style="list-style-type: none"> <li>Ministry of Environment and Physical Planning, Republic of Macedonia. 2009. HCFC Management Phase out Plan. Available at:  <a href="http://webcache.googleusercontent.com/search?q=cache:5aHJf6nDhv8J:www.ozoneunit.gov.mk/eng/doc/HPMP_Final_Report-en.doc+&amp;cd=1&amp;hl=en&amp;ct=clnk&amp;gl=us">http://webcache.googleusercontent.com/search?q=cache:5aHJf6nDhv8J:www.ozoneunit.gov.mk/eng/doc/HPMP_Final_Report-en.doc+&amp;cd=1&amp;hl=en&amp;ct=clnk&amp;gl=us</a></li> <li>Official Gazette of the Republic of Macedonia can be found at (Laws written in Macedonian):  <a href="http://www.slvesnik.com.mk/besplatni-izdanija.nspx?pYear=2005">http://www.slvesnik.com.mk/besplatni-izdanija.nspx?pYear=2005</a></li> </ul> <p><i>(The information above was reviewed or provided by the government.)</i></p>		

## Montenegro

<b>Name of Policy</b>	Law on Air Protection
<b>Governing Body</b>	Environmental Protection Agency
<b>National Contact Office</b>	Tatjana Boljevic, Senior Adviser (Head of the National Ozone Unit) Focal Point for Vienna Convention and Montreal Protocol Address: IV Proleterske 19 Podgorica, Montenegro Tel: + 382 20 618 261; Fax: +382 20 446 587; E-mail: tatjana.djurcevic@epa.org.me; tanjadjurcevic@gmail.com
<b>Date of Implementation</b>	2010-2012
<b>Type of Policy</b>	
<input checked="" type="checkbox"/> Taxes, Levies, and Other Types of Fees	<input checked="" type="checkbox"/> Required Practices
<input type="checkbox"/> Economic and Market-Based Incentives	<input checked="" type="checkbox"/> Import/Export Licensing
<input checked="" type="checkbox"/> Prohibition/Authorization	<input checked="" type="checkbox"/> Reporting/Recordkeeping Requirements
<b>Overview</b>	
<p><b>The Law on Administrative Taxes</b> The Law on administrative taxes ("Official Gazette of MNE, 15/2012) stipulates that the administrative fee is 5 EUR (USD 6.60)<sup>a</sup> for each application for import/export of HFCs.</p> <p><b>The Decree on ODS and Alternative Substances (F-gases)</b> The Decree on ODS and alternative substances (F-gases) regulates: the handling of HFCs and other F-gases; the handling of products that contain such substances or are produced with them, import, export and marketing of such substances and products; the handling of such substances after terminating the use of products containing them; the method of collecting, using and permanently disposing of them; the method of labeling products that contain HFCs and other F-gases; and requirements to be met by legal persons and entrepreneurs that are engaged in the maintenance, repair, and disposal of the products containing HFCs and other F-gases.</p> <p>Additionally, during maintenance, repair, or decommissioning of products containing HFCs and other F-gases (e.g., refrigeration and air conditioning units) shall be recovered into a container for the purpose of recycling, reclamation or destruction. Recovery of controlled substances shall be performed by the legal person or entrepreneur who is authorized (i.e. has an EPA license) to perform maintenance activities and/or repair and decommission products containing HFCs and other F-gases.</p> <p>The Decree on ODS and alternative substances (F gases) prescribes requirements to be met by legal persons and entrepreneurs that are engaged in the maintenance, repair as well as decommissioning of the products containing alternative substances. Service technicians are required to have a university degree, mechanical or technical engineering secondary school, and training in proper handling and servicing of refrigeration and air conditioning equipment.</p> <p>According to the Decree on ODS and alternative substances (Official Gaz. of MNE, No. 5/11) there are labeling requirements for products and cylinders containing HFCs and other F-gases. The label must include the chemical formula, amount of alternative substance expressed in kilograms and a note: "contains fluorinated gas governed by Kyoto Protocol."</p> <p>The Decree on ODS and alternative substances (F-gases) under the Law on Air Protection pertains to HFCs and other F-gases and their mixtures, and prohibits the following:</p> <ul style="list-style-type: none"> <li>• import and/or export of HFCs and other F-gases without a license from EPA;</li> <li>• environmental release of HFCs and other F-gases; and</li> <li>• retail sale of HFCs and other F-gases.</li> </ul> <p>The Decree also stipulates leakage requirements for 3+ kg equipment and systems containing HFCs and other F-gases.</p>	

In accordance with the Decree on ODS and Alternative Substances:

- The legal person or entrepreneur authorized for the maintenance and/or repair and decommissioning of the products containing HFCs and other F-gases shall maintain records of the collected substances, handling of such substances and amounts of virgin or recycled substances introduced into the products.
- The legal person or entrepreneur performing the imports, exports and placing of HFCs and other F-gases on the market are required to keep records of and report annually on: imports and end-users of such substances, imported amounts for each substance, amounts placed on the domestic market and their eventual purposes, existing stocks and other relevant details; exports, amounts exported, and amounts of recovered alternative substances exported for reclamation.
- The owner and/or user of stationary refrigeration and air conditioning equipment, fire protection systems, containing 3 kg or more of HFCs and other F-gases, shall notify the Agency in writing of introducing the product into use, within 15 days of the date of such introduction.

The Decree stipulates leakage requirements for three or more equipment and systems containing HFCs and other F-gases.

#### Resources

- Official Gazette of MNE, 15/2012. Available at: <http://www.opstinabor.rs/upload/SlistopstineBor15212.pdf>
- Montenegro Environmental Protection Agency. 2010. Law on Air Protection. No 25/10 of 5 May 2010. Available at: <http://www.epa.org.me/images/zakoni/zakon%20o%20zastiti%20vazduha.pdf>. Accessed May 2013.
- Decree on ODS and alternative substances (F gases) (OG MNE No. 5/2011). Available at: <http://www.mrt.gov.me/ResourceManager/FileDownload.aspx?rId=122894&rType=2>

*(The information above was reviewed or provided by the government.)*

<sup>a</sup> The exchange rate applied is 1 EUR = 1.32 USD (August 2013).

## Netherlands

<b>Name of Policy</b>	The Netherlands' Climate Policy Implementation Plan, Part I: Measures in the Netherlands
<b>Governing Body</b>	Dutch Ministry of Infrastructure and Environment [VROM]
<b>National Contact Office</b>	<i>P.O. Box 20901, 2500 EX, The Hague, The Netherlands</i>
<b>Date of Implementation</b>	1999
<b>Type of Policy</b>	
<input type="checkbox"/> Taxes, Levies, and Other Types of Fees	<input checked="" type="checkbox"/> Required Practices
<input checked="" type="checkbox"/> Economic and Market-Based Incentives	<input type="checkbox"/> Import/Export Licensing
<input type="checkbox"/> Prohibition/Authorization	<input type="checkbox"/> Reporting/Recordkeeping Requirements
<b>Overview</b>	
<p>Through the Climate Policy Implementation Plan, the Reduction of Other Greenhouse Gases (ROB) program was implemented to reduce the emissions and use of HFCs. Destruction of HFCs (as process emissions) is improved through further optimization of the after-burning process, which limits HFC emissions. Additionally, HFC emissions (as alternatives to CFCs, HCFCs, and halons) are reduced through improved monitoring of equipment and by limiting emissions (e.g., through tightening equipment to reduce leaks). Non-HFC alternatives are promoted through this program, and subsidies are provided to develop and introduce innovative energy-efficient low-GWP alternatives and perform feasibility studies for the following applications:</p> <ul style="list-style-type: none"> <li>• Supermarkets</li> <li>• Datacenters</li> <li>• Ships</li> <li>• Hospitals</li> <li>• Refrigerated transport (trucks and vans)</li> <li>• Food industry</li> </ul>	
<b>Resources</b>	
<ul style="list-style-type: none"> <li>• VROM (1999). Climate Policy Implementation Plan, Part I: Domestic measures. VROM, The Hague. Available at: <a href="http://www.greenhousegases.nl/docs/VROMNCPIPPart1.pdf">http://www.greenhousegases.nl/docs/VROMNCPIPPart1.pdf</a>. Accessed May 2013.</li> </ul> <p><i>(The information above was reviewed or provided by the government.)</i></p>	

<b>Country</b>	Netherlands
<b>Name of Policy</b>	Dutch Regulation for Containment of Refrigerant Gases
<b>Governing Body</b>	Dutch Ministry of Infrastructure and Environment [VROM]
<b>National Contact Office</b>	P.O. Box 20901, 2500 EX, The Hague, The Netherlands
<b>Date of Implementation</b>	1993
<b>Type of Policy</b>	
<input type="checkbox"/> Taxes, Levies, and Other Types of Fees	<input checked="" type="checkbox"/> Required Practices
<input type="checkbox"/> Economic and Market-Based Incentives	<input type="checkbox"/> Import/Export Licensing
<input type="checkbox"/> Prohibition/Authorization	<input type="checkbox"/> Reporting/Recordkeeping Requirements
<b>Overview</b>	
<p>In 1992, the Minister of Housing, Spatial Planning, and the Environment (VROM) introduced the Program for Containment of Refrigerant Gases (STEK) to implement a certification program for refrigeration contractors supported by government legislation in 1993. In consultation with experts from the refrigeration industry, STEK set up a program to train engineers in the new regulations and technical requirements for mobile and stationary refrigeration and air conditioning equipment and heat pumps. The aim of the STEK program was to promote and achieve the careful and skillful handling of cooling agents to prevent emissions from refrigeration and air-conditioning equipment filled with HFCs or other F-gases. The government has provided initial guidance and financial support. From 2006, similar provisions were required by EU regulations on F-gases (EC/842/2006) and ODS (EC/1005/2009), according to which the STEK programme has been adapted.</p> <p>Owners or users of equipment filled with HFCs or other F-gases are obliged by law to have their equipment serviced and repaired, perform regular preventive leakage checks and register refrigerant use in a logbook with the installation. Installations need to be labeled, providing information on the refrigerant charge. Installation and maintenance companies and personnel need to be certified, and are audited by a company approved by assigned certifying bodies (formerly STEK). Therefore, only companies and personnel with an F-gas certificate may carry out work on refrigeration equipment.</p> <p>The following results have been identified:</p> <ul style="list-style-type: none"> <li>• Annual leakage rate changes of HFC (or other F-gas) refrigeration and air-conditioning equipment have been reported to fall from the European average of 15 percent to 5 percent in 1999, though there is some dispute over the method to measure leakage.</li> <li>• Other sources from studies in commercial and industrial refrigeration report average leak rates between 6.9 percent and 12.7 percent annually.</li> </ul>	
<b>Resources</b>	
<ul style="list-style-type: none"> <li>• European Commission. Protection of the ozone layer. Available at: <a href="http://ec.europa.eu/clima/policies/ozone/documentation_en.html">http://ec.europa.eu/clima/policies/ozone/documentation_en.html</a></li> <li>• European Commission. EU legislation to control F-gases. Available at: <a href="http://ec.europa.eu/clima/policies/f-gas/legislation/documentation_en.html">http://ec.europa.eu/clima/policies/f-gas/legislation/documentation_en.html</a></li> <li>• European Partnership for Energy and the Environment (EPEE). 2005. Successful Dutch Programme for Containment of Refrigerant Gases (STEK) Continues to Provide a Sound Basis for Future Regulation of F-gases in Europe. Available at: <a href="http://www.fluorocarbons.org/uploads/Modules/Library/epee24june2005response_ieep_june05.pdf">http://www.fluorocarbons.org/uploads/Modules/Library/epee24june2005response_ieep_june05.pdf</a>. Accessed April 2013.</li> <li>• Institute of Refrigeration (IOR). 2010. REAL Zero – Reducing refrigerant emissions &amp; leakage – feedback from the IOR project. Available at: <a href="http://www.epa.gov/greenhill/downloads/IOR_ReducingRefrigerantEmissions.pdf">http://www.epa.gov/greenhill/downloads/IOR_ReducingRefrigerantEmissions.pdf</a>. Accessed April 2013.</li> <li>• STEK. What is STEK? Available at: <a href="http://www.fluorocarbons.org/uploads/Modules/Library/what_is_stek.doc">http://www.fluorocarbons.org/uploads/Modules/Library/what_is_stek.doc</a>. Accessed April 2013.</li> </ul> <p><i>(The information above was reviewed or provided by the government.)</i></p>	

## Norway

<b>Name of Policy</b>	Excise Duty on Hydrofluorocarbons (HFCs) and Perfluorocarbons (PFCs) 2012 Circular no. 7/2012 S
<b>Governing Body</b>	Excise Department, Directorate of Customs and Excise
<b>National Contact Office</b>	Climate and Pollution Agency
<b>Date of Implementation</b>	Tax originally implemented January 1, 2003. Updated tax rate as of January 1, 2012.
<b>Type of Policy</b>	
<input checked="" type="checkbox"/> Taxes, Levies, and Other Types of Fees	<input type="checkbox"/> Required Practices
<input checked="" type="checkbox"/> Economic and Market-Based Incentives	<input type="checkbox"/> Import/Export Licensing
<input type="checkbox"/> Prohibition/Authorization	<input type="checkbox"/> Reporting/Recordkeeping Requirements
<b>Overview</b>	
<p>As of January 1, 2012, an excised duty is charged upon any importation and domestic production of HFCs and PFCs, including recycled HFCs and PFCs. The duty on HFCs is:<sup>a</sup></p> $HFC\ Duty \left( \frac{NOK\ or\ USD}{kg} \right) = \left( \frac{0.224\ NOK}{kg} \right) \times (GWP) = \left( \frac{0.04\ USD}{kg} \right) \times (GWP)$ <p>This includes all mixtures of HFCs, both as own compounds and mixed with other substances, as well as HFCs that are included as ingredients in other products.</p> <p>An exemption is made on this excise duty for a product that:</p> <ol style="list-style-type: none"> <li>is meant for export to foreign countries,</li> <li>is stored in customs warehouses when the products are designated for exportation,</li> <li>is imported <ol style="list-style-type: none"> <li>as personal effects (pursuant to Section 5-1 of the Norwegian Customs Act),</li> <li>for use in means of transportation for commercial activities (pursuant to Section 5-2 of the Norwegian Customs Act),</li> <li>according to Section 5-9 of the Norwegian Customs Act and is of little or no economic value,</li> <li>are for temporary use (pursuant to Section 6-1 second paragraph of the Norwegian Customs Act),</li> </ol> </li> <li>pursuant to Section 5-3 of the Norwegian Customs Act, delivered to or introduced by <ol style="list-style-type: none"> <li>diplomats,</li> <li>NATO and military forces from countries that are participating in the Partnership for Peace Programme,</li> <li>The Nordic Investment Bank,</li> </ol> </li> <li>is returned to the registered company's warehousing facilities,</li> <li>is recycled.</li> </ol> <p>HFC import and production taxes were originally introduced in January 2003 at a rate of 0.183 NOK/kg of CO<sub>2</sub>-eq. (approximately USD 0.03/kg of CO<sub>2</sub>-eq.)<sup>a</sup> on import and production. A refund program was subsequently introduced in July 2004. When HFCs are offered for destruction, the amount paid in taxes is refunded.</p> <p>In 2011, the revenue from this HFC and PFC tax was approximately NOK 222 million NOK (USD 36.63 million).<sup>a</sup></p>	
<b>Resources</b>	
<ul style="list-style-type: none"> <li>Ministry of Finance. 2011. Green taxes 2011. Available at: <a href="http://www.regjeringen.no/nb/dep/fin/tema/skatter_og_avgifter/green-taxes-2011.html?id=609076">http://www.regjeringen.no/nb/dep/fin/tema/skatter_og_avgifter/green-taxes-2011.html?id=609076</a>. Accessed April 2013.</li> <li>Norwegian Customs and Excise. 2013. Excise Duty on HFC and PFC 2013. Available at: <a href="http://www.toll.no/upload/aarsrundskriv/Engelske/HFC-PFC.pdf">http://www.toll.no/upload/aarsrundskriv/Engelske/HFC-PFC.pdf</a>. Accessed April 2013.</li> <li>Statistics Norway. 2007. Emissions from consumption of HFCs, PFCs and SF<sub>6</sub> in Norway. Available at: <a href="http://www.ssb.no/a/english/publikasjoner/pdf/doc_200708_en/doc_200708_en.pdf">http://www.ssb.no/a/english/publikasjoner/pdf/doc_200708_en/doc_200708_en.pdf</a>. Accessed April 2013.</li> </ul>	

<sup>a</sup> Based on an exchange rate of 1 NOK = 0.17 USD (August 2013).

<b>Country</b>	Norway
<b>Name of Policy</b>	Hydrofluorocarbon (HFC) and Perfluorocarbon (PFC) Tax
<b>Governing Body</b>	Excise Department, Directorate of Customs and Excise
<b>National Contact Office</b>	Climate and Pollution Agency
<b>Date of Implementation</b>	January 1, 2013
<b>Type of Policy</b>	
<input checked="" type="checkbox"/> Taxes, Levies, and Other Types of Fees	<input type="checkbox"/> Required Practices
<input type="checkbox"/> Economic and Market-Based Incentives	<input type="checkbox"/> Import/Export Licensing
<input type="checkbox"/> Prohibition/Authorization	<input type="checkbox"/> Reporting/Recordkeeping Requirements
<b>Overview</b>	
As of January 1, 2012, a HFC (and PFC) tax for greenhouse gases in automotive air conditioning systems is levied when importing a car. The amount of tax is dependent on the greenhouse gas. Most air conditioning systems use a gas that is taxed at a rate of <b>NOK 292.50 (approximately USD 48.18)<sup>a</sup> per kilogram</b> , and the computation is based on the weight of the greenhouse gas.	
<b>Resources</b>	
<ul style="list-style-type: none"> <li>Norwegian Customs and Excise. 2013. Hydrofluorocarbon (HFC) and Perfluorocarbon (PFC) Tax. Available at: &lt;<a href="http://www.toll.no/templates_TAD/Topic.aspx?id=219613&amp;epslanguage=en">http://www.toll.no/templates_TAD/Topic.aspx?id=219613&amp;epslanguage=en</a>&gt;. Accessed April 2013.</li> </ul>	

<sup>a</sup> Based on an exchange rate of 1 NOK = 0.17 USD (August 2013).

## Poland

<b>Name of Policy</b>	Emission Fees, POM Fees and Reporting/Recordkeeping Requirements
<b>Governing Body</b>	Ministry of the Environment, Department of Air Protection
<b>National Contact Office</b>	Industrial Chemistry Research Institute, Ozone Layer Protection Unit 8, Rydygiera Street, 01-793 Warsaw, Poland Tel: (+4822) 5682845 e-mail: kozak@ichp.pl
<b>Date of Implementation</b>	Emission Fee for F-gases: existing requirement since 2011 POM Fee and Reporting/Recordkeeping requirements: planned to commence in 2014
<b>Type of Policy</b>	
<input checked="" type="checkbox"/> Taxes, Levies, and Other Types of Fees <input type="checkbox"/> Required Practices <input type="checkbox"/> Economic and Market-Based Incentives <input type="checkbox"/> Import/Export Licensing <input type="checkbox"/> Prohibition/Authorization <input checked="" type="checkbox"/> Reporting/Recordkeeping Requirements	
<b>Overview</b>	
<p><b>Emission Fee for HFCs and other F-gases.</b> Emission fee for HCFs and other F-gases equal to PLN 27.66 (USD 8.51)<sup>a</sup>/kg is in place as part of an established fee for “using the environment.” The fees are collected by local administration and the collected monies are submitted to Polish State Fund for Environmental Protection and Water Management.</p> <p><b>Placing on the Market (POM) Fee.</b> A POM fee will be introduced in 2014 for HFCs and other F-gases that enter commerce in Poland. The fee also applies to equipment containing HFCs and other F-gases. Exemptions will be granted to F-gases in the production of MDIs and MDIs that contain F-gases. The fee will be equal to 0.003 PLN<sup>a</sup>/kg GWP (approximately 0.001 USD/kg GWP). Money collected from the fees will be placed on special account at Polish State Fund for Environmental Protection and Water Management and will be used for managing F-gases in Poland through the operation of databases and F-gas emission reduction projects.</p> <p><b>F-gas Databases and Reporting Requirements.</b> The Ozone Layer and Climate Protection Unit (OLPU) located in the Industrial chemistry Research Institute will develop and maintain two central databases: The Central Register of Operators and the Central F-gas Database. Starting in 2014, the Central Register of Operators will house information reported by operators of stationary equipment containing 3 kg or more of HFCs (as well as other F-gases). Operators will be required to keep equipment logbooks to report electronically throughout a year on any operation performed on that equipment, including: installation, servicing, leakage checks, decommissioning, etc. Additionally, operators must report on reasons for leakages and how those leakages were dealt with. The Central F-gas Database will be used to store the information reported annually by the following entities:</p> <ul style="list-style-type: none"> <li>• Entities that import or export HFCs (there are no F-gas producers in Poland);</li> <li>• Entities that use HFCs;</li> <li>• Entities that recover/recycle/reclaim/destroy HFCs; and</li> <li>• Entities that manufacture, import or export products and equipment containing HFCs.</li> </ul> <p>The reported information will be collected and analyzed by OLPU. The results of the analysis will be submitted to Poland’s Ministry of the Environment. Aggregated data, including data on total quantities and types of F-gases imported/exported annually and total emissions from a particular type of equipment will be made available for entities who submitted data.</p>	
<b>Resources</b>	
<ul style="list-style-type: none"> <li>• Communiqué by the Minister of the Environment of 26 Sep 2011, Monitor Polski Nr 94, poz. 958 (available in Polish only).</li> <li>• No official references are available for POM Fee and Reporting/Record keeping requirements. The relevant legislation has been drafted and is presently processed in the Government Administration.</li> </ul> <p><i>(The information above was reviewed or provided by the government.)</i></p>	

<sup>a</sup> Based on an exchange rate of 1 PLN = 0.31 USD (August 2013).

## Slovenia

<b>Name of Policy</b>	Regulation on Changes and Amendments to the Regulation on the Environmental Tax for Polluting the Air with Carbon Dioxide Emissions, Official Gazette of the Republic of Slovenia 78/08, 2008.
<b>Governing Body</b>	
<b>National Contact Office</b>	
<b>Date of Implementation</b>	January 1, 2009
<b>Type of Policy</b>	
<input checked="" type="checkbox"/> Taxes, Levies, and Other Types of Fees	<input type="checkbox"/> Required Practices
<input type="checkbox"/> Economic and Market-Based Incentives	<input type="checkbox"/> Import/Export Licensing
<input type="checkbox"/> Prohibition/Authorization	<input type="checkbox"/> Reporting/Recordkeeping Requirements
<b>Overview</b>	
Slovenia introduced an environmental tax on the use of HFCs and other F-gases in 2009. The tax is based on the climate impact of the substance and the price per unit of CO <sub>2</sub> -eq. is defined by the Slovenian government each year. The full price of this tax is €0.0125 (USD 0.020). <sup>a</sup> The level of the tax applied depends on the use of the HFC or other F-gas: the first fill of precharged and stationary equipment is taxed at five percent while servicing and maintenance is taxed at 100 percent. This tax applies within Slovenia only and does not apply in neighbor countries.	
<b>Resources</b>	
<ul style="list-style-type: none"> <li>Schwarz, W. et al. 2011. "Preparatory study for a review of Regulation (EC) No 842/2006 on certain fluorinated greenhouse gases." European Commission. Available at: <a href="http://ec.europa.eu/clima/policies/f-gas/docs/2011_study_en.pdf">http://ec.europa.eu/clima/policies/f-gas/docs/2011_study_en.pdf</a>. Accessed May 2013.</li> </ul>	

<sup>a</sup> Based on an exchange rate of 1.00 € = 1.32 USD (May 2013).

## Sweden

<b>Name of Policy</b>	Unknown.
<b>Governing Body</b>	Environmental Protection Agency
<b>National Contact Office</b>	Unit of Research and Evaluation
<b>Date of Implementation</b>	Unknown.
<b>Type of Policy</b>	
<input type="checkbox"/> Taxes, Levies, and Other Types of Fees	<input type="checkbox"/> Required Practices
<input type="checkbox"/> Economic and Market-Based Incentives	<input type="checkbox"/> Import/Export Licensing
<input checked="" type="checkbox"/> Prohibition/Authorization	<input type="checkbox"/> Reporting/Recordkeeping Requirements
<b>Overview</b>	
<p>In Sweden, prior to the EC F-gas regulations, the maximum HFC refrigerant charge for any system was restricted to 200 kg. The maximum refrigerant charge allowed in a supermarket refrigeration system was restricted to 20 kg for medium temperature applications and 30 kg for low temperature. The effect of refrigerant charge restrictions is to encourage the use of lower-GWP alternatives and minimize HFC refrigerant charges, thereby reducing the risk of HFC emissions.</p>	
<p>Note: Certain details on this policy, including its official name, were not found.</p>	
<b>Resources</b>	
<ul style="list-style-type: none"> <li>• Expert Group. 2010. Refrigerant emissions in Australia. Prepared for the Australian Government, Department of the Environment, Water, Heritage and the Arts, Environment Protection Branch. Available at: <a href="http://www.environment.gov.au/atmosphere/ozone/sgg/equivalentcarbonprice/publications/pubs/refrigerant-emissions.pdf">http://www.environment.gov.au/atmosphere/ozone/sgg/equivalentcarbonprice/publications/pubs/refrigerant-emissions.pdf</a>. Accessed April 2013.</li> <li>• Institute of Refrigeration (IOR). 2010. REAL Zero – Reducing refrigerant emissions &amp; leakage – feedback from the IOR project. Available at: <a href="http://www.epa.gov/greenhill/downloads/IOR_ReducingRefrigerantEmissions.pdf">http://www.epa.gov/greenhill/downloads/IOR_ReducingRefrigerantEmissions.pdf</a>. Accessed April 2013.</li> <li>• Swedish Meteorological and Hydrological Institute (SMED). 2011. Fluorinated Greenhouse Gases in Sweden. Report No 98. Commissioned by the Swedish Environmental Protection Agency. Available at: <a href="http://www.smed.se/wp-content/uploads/2012/01/Fluorinated-Greenhouse-Gases-in-Sweden.pdf">http://www.smed.se/wp-content/uploads/2012/01/Fluorinated-Greenhouse-Gases-in-Sweden.pdf</a>. Accessed April 2013.</li> </ul>	
<p><i>(The information above was reviewed or provided by the government.)</i></p>	

<b>Country</b>	Sweden
<b>Name of Policy</b>	Ordinance on refrigeration and heat pump systems containing CFC, other CFCs, halons, HCFCs, and HFCs (SNF 1992:16) [With amending regulations SNFS 1993: 2, 1993:8, 1994:5, and 1997:3 and NFS 2003:11]
<b>Governing Body</b>	Environmental Protection Agency
<b>National Contact Office</b>	Unit of Research and Evaluation
<b>Date of Implementation</b>	1993
<b>Type of Policy</b>	
<input type="checkbox"/> Taxes, Levies, and Other Types of Fees	<input checked="" type="checkbox"/> Required Practices
<input type="checkbox"/> Economic and Market-Based Incentives	<input type="checkbox"/> Import/Export Licensing
<input type="checkbox"/> Prohibition/Authorization	<input type="checkbox"/> Reporting/Recordkeeping Requirements
<b>Overview</b>	
Producers and suppliers of HFCs for refrigeration and heat pump systems are required to accept recovered, bulk HFCs for further recycling, reclamation, or destruction.	
<b>Resources</b>	
<ul style="list-style-type: none"> <li>Environmental Protection. 1992. Ordinance on refrigeration and heat pump systems containing CFC, other CFCs, halons, HCFCs, and HFCs. SNF: 1992:16 MS:54. Available online at: <a href="http://www.naturvardsverket.se/Documents/foreskrifter/nfs1992/SNFS1992_16k.pdf">http://www.naturvardsverket.se/Documents/foreskrifter/nfs1992/SNFS1992_16k.pdf</a>. Accessed May 2013.</li> </ul> <p><i>(The information above was reviewed or provided by the government.)</i></p>	

## Switzerland

<b>Name of Policy</b>	Swiss F-gas Policy
<b>Governing Body</b>	Swiss Federal Office for the Environment
<b>National Contact Office</b>	Division Air protection and Chemicals, attention of Mr. B. Horisberger, CH-3003 Bern, Switzerland; blaise.horisberger@bafu.admin.ch Tel.: +41 31 322 90 24
<b>Date of Implementation</b>	2003; amendments in November 2012
<b>Type of Policy</b>	
<input type="checkbox"/> Taxes, Levies, and Other Types of Fees	<input checked="" type="checkbox"/> Required Practices
<input type="checkbox"/> Economic and Market-Based Incentives	<input type="checkbox"/> Import/Export Licensing
<input checked="" type="checkbox"/> Prohibition/Authorization	<input checked="" type="checkbox"/> Reporting/Recordkeeping Requirements
<b>Overview</b>	
<p>The Swiss F-gas regulation requires companies to report to the national authorities on quantities of HFCs imported. In addition, the regulation includes bans on the following:</p> <p><b>Annex 2.3 Solvents</b></p> <ul style="list-style-type: none"> <li>• General ban of HFC-based solvents (with some exemptions)</li> </ul> <p><b>Annex 2.9 Synthetic foams</b></p> <ul style="list-style-type: none"> <li>• Ban of HFCs in non-insulating foams</li> <li>• Ban of HFC containing foams if the required thermal insulation can be obtained otherwise in an environmentally friendly manner</li> </ul> <p><b>Annex 2.10 Refrigerants</b></p> <ul style="list-style-type: none"> <li>• Ban on equipment containing HFCs, including: plug-in appliances and MACs (exemptions upon technically justified requests)</li> <li>• Ban on stationary systems in the following applications (no exemptions): <ul style="list-style-type: none"> <li>○ Systems with an air-cooled condenser and containing a refrigerant with a GWP above 4,000;</li> <li>○ Systems with an air-cooled condenser, containing a refrigerant with a GWP above 2,000 and a cooling capacity above 100 kW; and</li> <li>○ Direct expansion air cooling systems connected to more than 2 evaporators and a cooling capacity above 80 kW.</li> </ul> </li> </ul> <p>In addition, Annex 2.10 requires the following for stationary systems with more than 3 kg of refrigerant:</p> <ul style="list-style-type: none"> <li>• Yearly tightness control of systems containing HFC refrigerants;</li> <li>• Mandatory maintenance booklet of systems containing HFC refrigerants; and</li> <li>• Public register for HFC-based refrigerants.</li> </ul> <p>Through an amendment in November 2012, HFCs are also banned in a series of air-conditioning and refrigeration applications starting in December 2013 (exemptions can be granted for a particular system upon technically justified requests):</p> <ul style="list-style-type: none"> <li>• Air conditioning systems for: <ul style="list-style-type: none"> <li>○ Cooling with a cooling capacity of more than 600 kW;</li> <li>○ Cooling and heating by means of variable refrigerant flow or variable refrigerant volume systems with more than 40 evaporator units and cooling capacity &gt; 80 kW; and</li> <li>○ For domestic and district heating by heat pump with cooling capacity &gt; 600 kW.</li> </ul> </li> </ul>	

- Commercial refrigeration systems for:
  - Minus cooling with a cooling capacity > 30 kW;
  - Plus cooling with cooling capacity > 40 kW; and
  - Combined plus and minus cooling with a cooling capacity > 40 kW for plus cooling and 8 kW for minus cooling.
- Industrial refrigeration systems for:
  - Deep freezing with a cooling capacity > 100 kW; and
  - All other applications with a cooling capacity > 400 kW.
- Ice rinks, except for temporary systems.

**Annex 2.11 Extinguishing Agents**

- HFC-based extinguishing agents are banned (exemptions for aircrafts, military vehicles, nuclear plants, and upon technically justifies requests)

**Annex 2.12 Spray Cans**

- General ban of spray cans containing HFCs (exemptions for MDIs, safety reasons, and cleaning of equipment under electric tension)

**Resources**

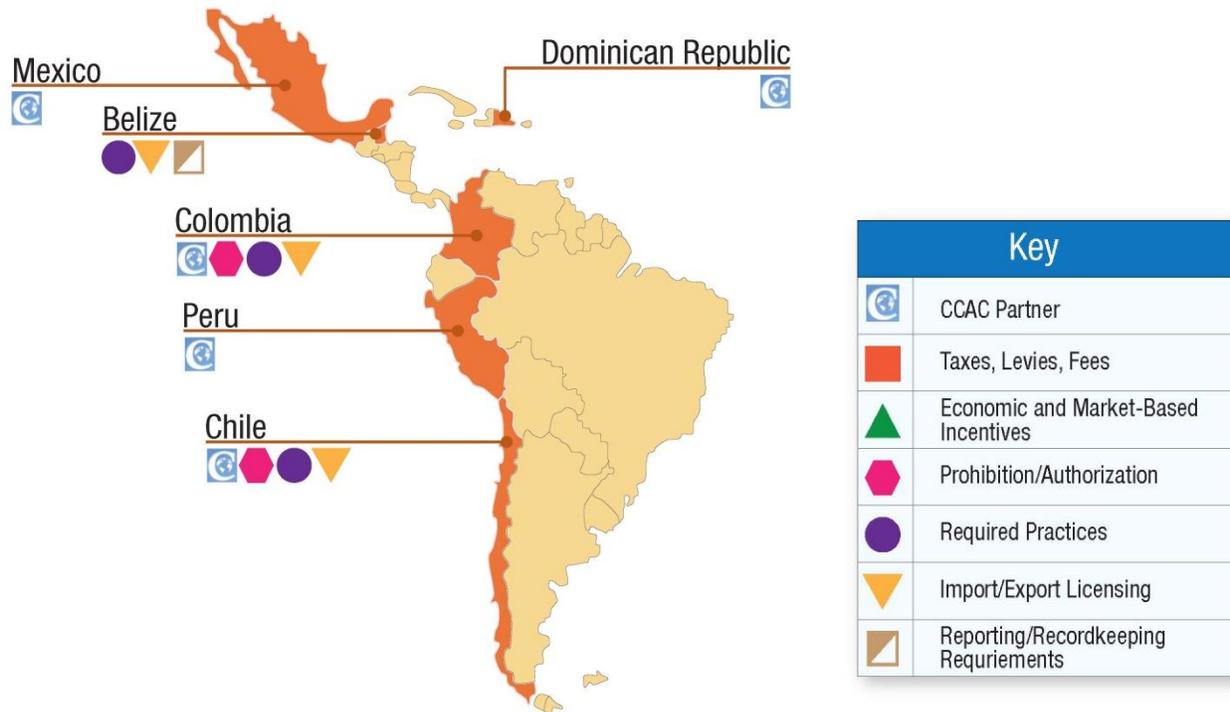
- Swiss Federal Council. 2003. Amendment to the Ordinance on Environmentally Hazardous Substances. 30 April 2003. Available at: <http://www.news.admin.ch/NSBSubscriber/message/attachments/1187.pdf>. Accessed May 2013.
- Switzerland Federal Office for the Environment (FOEN). 2003. Synthetic greenhouse 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>. Accessed April 2013.

*(The information above was reviewed or provided by the government.)*

## United Kingdom

<b>Name of Policy</b>	Fluorinated Greenhouse Gas Regulations 2009 (FGG)
<b>Governing Body</b>	Department of Environment, Food, and Rural Affairs (DEFRA)
<b>National Contact Office</b>	Environment Agency
<b>Date of Implementation</b>	March 2009
<b>Type of Policy</b>	
<input type="checkbox"/> Taxes, Levies, and Other Types of Fees	<input checked="" type="checkbox"/> Required Practices
<input type="checkbox"/> Economic and Market-Based Incentives	<input type="checkbox"/> Import/Export Licensing
<input type="checkbox"/> Prohibition/Authorization	<input type="checkbox"/> Reporting/Recordkeeping Requirements
<b>Overview</b>	
<p>The FGG sets out the legal obligations for companies and qualification requirements for personnel working on HFC-containing stationary refrigeration (and other nominated industry sectors) covered by the EC F-Gas Regulation. The FGG Regulations of 2009 are effectively identical to the EU F-Gas Regulations although its main purpose is to detail certain UK specific issues such as approved training courses, offences and penalties for non-compliance (e.g., fines; required proper disposal of product or equipment without causing pollution to the environment or harm to human health or the health of animals or plants and/or; removal of product or equipment).</p> <p>Northern Ireland follows the Fluorinated Greenhouse Gas Regulations 2009 as well. In 2012 and 2013, however, Northern Ireland sought to make various amendments within the policy, including the definitions of offshore installation, the Department responsible for enforcement, and a quote in regulation 48. These proposed amendments can be found in the 2013 “Fluorinated Greenhouse Gases (Amendment) Regulations (Northern Ireland)” consultation paper.</p>	
<b>Resources</b>	
<ul style="list-style-type: none"> <li>• United Kingdom. 2009. The Fluorinated Greenhouse Gases Regulations 2009. No. 261. Available at: <a href="http://www.legislation.gov.uk/ukxi/2009/261/contents/made">http://www.legislation.gov.uk/ukxi/2009/261/contents/made</a>. Accessed April 2013.</li> <li>• Northern Ireland Department of the Environment, 2009. The Fluorinated Greenhouse Gas Regulations (Northern Ireland). Available at <a href="http://www.doeni.gov.uk/final_version_of-_fluorinated_greenhouse_gases_regulations_ni_2009.pdf">http://www.doeni.gov.uk/final_version_of-_fluorinated_greenhouse_gases_regulations_ni_2009.pdf</a></li> <li>• Northern Ireland Department of the Environment, 2013. The Fluorinated Greenhouse Gases (Amendment) Regulations (Northern Ireland) 2013: A Consultation Paper. Available at: <a href="http://www.doeni.gov.uk/consultation_document_fluorinated_greenhouse_gases_amendment_regulations_ni_2013.pdf">http://www.doeni.gov.uk/consultation_document_fluorinated_greenhouse_gases_amendment_regulations_ni_2013.pdf</a></li> </ul> <p><i>(The information above was reviewed or provided by the government.)</i></p>	

## Latin America and the Caribbean



### Belize

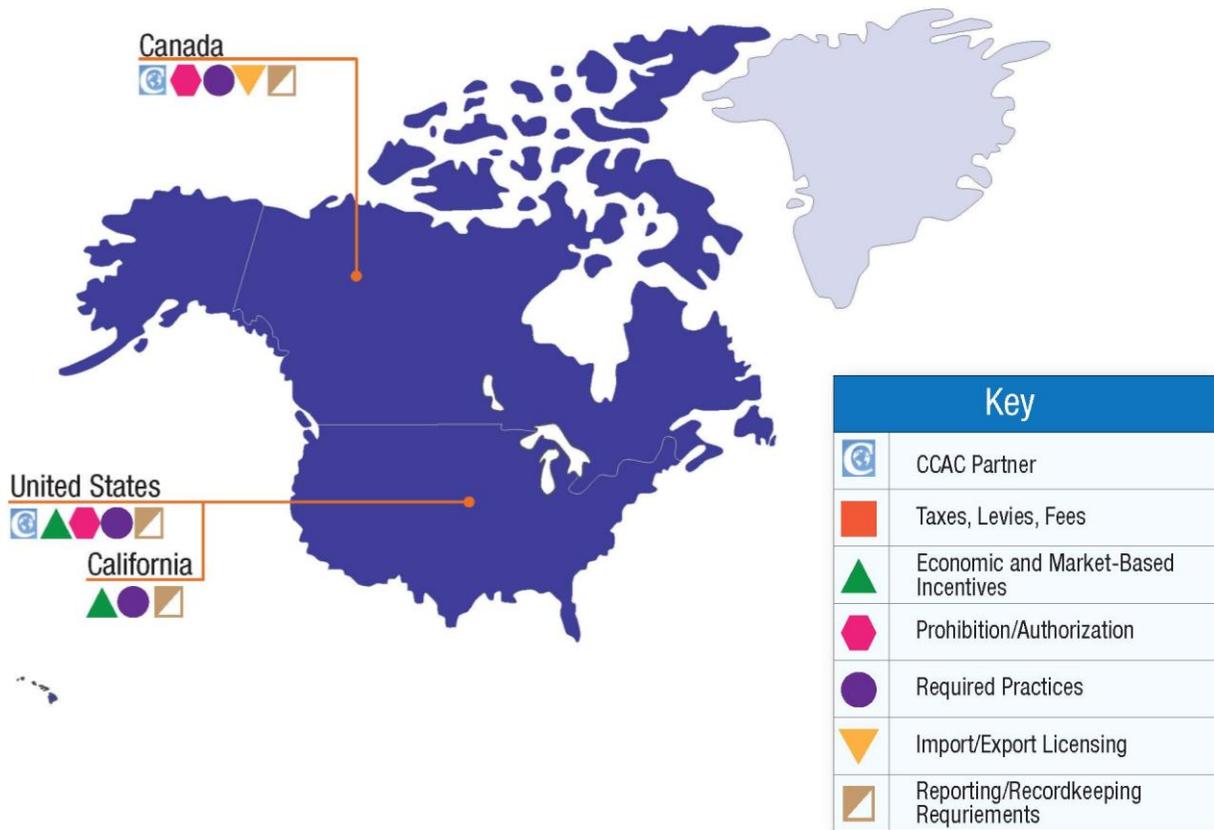
<b>Name of Policy</b>	Pollution (Amendment) Regulations, 2009	
<b>Governing Body</b>	Department of Environment	
<b>National Contact Office</b>	National Ozone Unit	
<b>Date of Implementation</b>	2009	
<b>Type of Policy</b>		
<input type="checkbox"/> Taxes, Levies, and Other Types of Fees	<input checked="" type="checkbox"/> Required Practices	
<input type="checkbox"/> Economic and Market-Based Incentives	<input checked="" type="checkbox"/> Import/Export Licensing	
<input type="checkbox"/> Prohibition/Authorization	<input checked="" type="checkbox"/> Reporting/Recordkeeping Requirements	
<b>Overview</b>		
Any individual or company is required to apply for a license to import or export any type HFCs (or other refrigerant gases) in Belize. In addition to licensing, there are also labeling and reporting requirements on HFC imports and exports.		
<b>Resources</b>		
<ul style="list-style-type: none"> <li>Department of Environment. 2009. "Pollution (Amendment) Regulations, 2009." Available at: <a href="http://www.doe.gov.bz/documents/legislation/Pollution%20(Amendment)%20Regulations,%202009.pdf">http://www.doe.gov.bz/documents/legislation/Pollution%20(Amendment)%20Regulations,%202009.pdf</a>. Accessed May 2013.</li> </ul>		

## Colombia

<b>Name of Policy</b>	Approval request and Environment Licensing
<b>Governing Body</b>	Ministry of the Environment
<b>National Contact Office</b>	National Authority on Environment Licensing
<b>Date of Implementation</b>	Unknown
<b>Type of Policy</b>	
<input type="checkbox"/> Taxes, Levies, and Other Types of Fees	<input type="checkbox"/> Required Practices
<input type="checkbox"/> Economic and Market-Based Incentives	<input checked="" type="checkbox"/> Import/Export Licensing
<input type="checkbox"/> Prohibition/Authorization	<input type="checkbox"/> Reporting/Recordkeeping Requirements
<b>Overview</b>	
All importers must obtain an environmental license and seek for approval to import all HFCs for registration and trade control purposes. Related laws are Decree 948 (June 05, 1995); Resolution 304 (April 06, 2001); Resolution 734 (June 22, 2004); Resolution 874 (23 July 2004); Resolution 902 (23 May, 2006); External Circular 039 (November 19, 2008); External Circular 050 (November 22, 2012); Resolution 2329 (December 26, 2012)	
<b>Resources</b>	
<ul style="list-style-type: none"> <li>National Budget from: National Authority on Environment Licensing, Ministry of the Environment and Sustainable Development, and VUCE System (Exclusive Window for International Trade)</li> </ul> <i>(The information above was reviewed or provided by the government.)</i>	

<b>Country</b>	Colombia
<b>Name of Policy</b>	Regulation of Protection and Control of Air Quality (Decree 948, June 5, 1995)
<b>Governing Body</b>	Ministry of the Environment
<b>National Contact Office</b>	National Authority on Environment Licensing
<b>Date of Implementation</b>	
<b>Type of Policy</b>	
<input type="checkbox"/> Taxes, Levies, and Other Types of Fees	<input checked="" type="checkbox"/> Required Practices
<input type="checkbox"/> Economic and Market-Based Incentives	<input type="checkbox"/> Import/Export Licensing
<input checked="" type="checkbox"/> Prohibition/Authorization	<input type="checkbox"/> Reporting/Recordkeeping Requirements
<b>Overview</b>	
<p>The Ministry of the Environment establishes maximum permissible limits of air pollution for HFCs (and other greenhouse gases). Emissions standards are required when the chemical reaches the following level of contamination:</p> <ul style="list-style-type: none"> <li>75 percent of daily concentrations in one year is equal to or greater than the values of annual air quality standard or annual level of intake for that chemical.</li> <li>30 percent of the daily concentrations in one year is equal to or greater than the daily air quality standard or daily level of intake for that chemical.</li> <li>15 percent of the hourly concentrations in a year are equal to or greater than the values of the hourly air quality standard or hourly emissions level for that chemical.</li> </ul> <p>When, despite the implementation of control measures on emission sources or when scientific or technical studies find that weather conditions cause dispersion of the pollutants in a region to the extent that the individual concentrations of air pollutants present reach the degrees and frequencies established above, the chemical is subject to emission levels established by the Ministry of the Environment.</p>	
<b>Resources</b>	
<ul style="list-style-type: none"> <li>Colombian Ministry of the Environment. 1995. Regulation of Protection and Control of Air Quality. Decree 948 of 5<sup>th</sup> June 1995. Available at: <a href="http://web.law.columbia.edu/sites/default/files/microsites/climate-change/files/Resources/Climate-Change-Laws-of-the-World/Colombia-Air%20Quality%20Act.pdf">http://web.law.columbia.edu/sites/default/files/microsites/climate-change/files/Resources/Climate-Change-Laws-of-the-World/Colombia-Air%20Quality%20Act.pdf</a>. Accessed May 2013.</li> </ul> <i>(The information above was reviewed or provided by the government.)</i>	

## North America



## Canada

<b>Name of Policy</b>	Section 46 of Canadian Environmental Protection Act, 1999 (CEPA 1999)
<b>Governing Body</b>	Environment Canada (EC)
<b>National Contact Office</b>	Ozone Protection Programs
<b>Date of Implementation</b>	November 2005
<b>Type of Policy</b>	
<input type="checkbox"/> Taxes, Levies, and Other Types of Fees	<input checked="" type="checkbox"/> Required Practices
<input type="checkbox"/> Economic and Market-Based Incentives	<input type="checkbox"/> Import/Export Licensing
<input checked="" type="checkbox"/> Prohibition/Authorization	<input checked="" type="checkbox"/> Reporting/Recordkeeping Requirements
<b>Overview</b>	
<p>HFCs were added to Schedule 1 of the <i>Canadian Environmental Protection Act, 1999</i> (CEPA 1999) in November 2005 in order to enable the Government to use of a variety of preventive or control actions.</p> <p>The reporting on releases of HFCs to the atmosphere is regulated under section 46 of CEPA 1999 and is required from large industrial and commercial facilities that meet a certain threshold for their combined emissions in CO<sub>2</sub> equivalent of the six Kyoto Protocol Greenhouse Gases. Eligible releases are restricted to those associated with industrial processes and industrial product use. Facilities are required to report emissions to Environment Canada (EC) by the annual June 1<sup>st</sup> reporting deadline.</p> <p>Environment Canada conducted an HFC use survey, on a voluntary basis, for data years 2005-2010. The survey included quantities of HFCs distributed to major Canadian use sectors. Further gathering of information on imports, exports and uses is planned, and may include mandatory data collection.</p> <p>In Canada, the federal, provincial, and territorial governments have shared responsibility over the control of halocarbon alternatives to ozone-depleting substances. Currently, all but one province has implemented recovery/recycling and emissions control measures for HFCs. These control measures may include the prohibition of releasing HFCs from certain equipment (e.g. refrigeration, air conditioning, etc.); and requiring the recovery of HFCs from certain equipment.</p> <p>Canada is considering implementing a licensing and reporting system for import, export, and manufacture of HFCs. Additionally, a ban on imports of HFC refrigerant in non-refillable containers is also being considered.</p>	
<b>Resources</b>	
<ul style="list-style-type: none"> <li>Environment Canada. Hydrofluorocarbons that have the Molecular Formula C<sub>n</sub>H<sub>x</sub>F<sub>(2n+2-x)</sub> in which 0 &lt; n &lt; 6. Available at: <a href="http://www.ec.gc.ca/toxiques-toxics/default.asp?lang=En&amp;n=689D6C2A-1">http://www.ec.gc.ca/toxiques-toxics/default.asp?lang=En&amp;n=689D6C2A-1</a>. Accessed April 2013.</li> </ul> <p>(The information above was reviewed or provided by the government.)</p>	

## United States

<b>Name of Policy</b>	<b>Section 608 Requirements: Venting Prohibition</b>
<b>Governing Body</b>	U.S. EPA
<b>National Contact Office</b>	Stratospheric Protection Division, Office of Atmospheric Programs, Office of Air and Radiation (6205J)
<b>Date of Implementation</b>	November 15, 1995
<b>Type of Policy</b>	
<input type="checkbox"/> Taxes, Levies, and Other Types of Fees	<input type="checkbox"/> Required Practices
<input type="checkbox"/> Economic and Market-Based Incentives	<input type="checkbox"/> Import/Export Licensing
<input checked="" type="checkbox"/> Prohibition/Authorization	<input type="checkbox"/> Reporting/Recordkeeping Requirements
<b>Overview</b>	
<p>Under Section 608 (Clean Air Act), it is prohibited to knowingly vent refrigerant during the maintenance, service, repair, and disposal of refrigeration and air-conditioning equipment. The prohibition on venting HFCs and other substances substituting a class I or class I substance has been in effect since November 15, 1995. This ban was first instated only for class I and class II substances on July 1, 1992.</p> <p>Only certain types of releases are permitted under the prohibition:</p> <ol style="list-style-type: none"> <li>1. "De minimis" quantities of refrigerant released in the course of making good faith attempts to recapture and recycle or safely dispose of refrigerant; and</li> <li>2. Releases of HFCs and PFCs that are not used as refrigerants (note that heat transfer fluids are considered refrigerants).</li> </ol>	
<b>Resources</b>	
<ul style="list-style-type: none"> <li>• U.S. EPA. 2013. "Frequently Asked Questions on Section 608". Available online at: <a href="http://www.epa.gov/ozone/title6/608/faq.html">http://www.epa.gov/ozone/title6/608/faq.html</a>. Accessed April 2013.</li> <li>• U.S. EPA. 2011. "Complying With The Section 608 Refrigerant Recycling Rule". Available online at: <a href="http://epa.gov/ozone/title6/608/608fact.html#noventing">http://epa.gov/ozone/title6/608/608fact.html#noventing</a>. Accessed April 2013.</li> <li>• U.S. EPA. 2010. "Proposed Regulations for Recycling of Substitute Refrigerants under Section 608". Available online at: <a href="http://epa.gov/ozone/title6/608/subrecsm.html">http://epa.gov/ozone/title6/608/subrecsm.html</a>. Accessed April 2013.</li> </ul> <p><i>(The information above was reviewed or provided by the government.)</i></p>	

<b>Country</b>	<b>United States</b>
<b>Name of Policy</b>	<b>Section 609 Requirements: Motor Vehicle Air Conditioning (MVAC)</b>
<b>Governing Body</b>	U.S. EPA
<b>National Contact Office</b>	Stratospheric Protection Division, Office of Atmospheric Programs, Office of Air and Radiation (6205J)
<b>Date of Implementation</b>	January 29, 1998
<b>Type of Policy</b>	
<input type="checkbox"/> Taxes, Levies, and Other Types of Fees	<input checked="" type="checkbox"/> Required Practices
<input type="checkbox"/> Economic and Market-Based Incentives	<input type="checkbox"/> Import/Export Licensing
<input type="checkbox"/> Prohibition/Authorization	<input checked="" type="checkbox"/> Reporting/Recordkeeping Requirements
<b>Overview</b>	
<p>The United States has established standards for MVAC refrigerant recovery and recycling equipment and for the proper use of that equipment. Any equipment used to recover or recycle HFC-134a from MVACs must meet U.S. government standards and be tested by an approved testing laboratory (UL or ETL). In addition, equipment that recovers, but does not recycle, one single, specific blend refrigerant must meet U.S. government standards and be tested by UL or ETL. In addition, automotive service technicians must be certified to handle HFC refrigerants.</p> <ul style="list-style-type: none"> <li>• <b>Approved Equipment:</b> Technicians who repair or service MVACs must recover the HFCs or other refrigerants and either recycle it on-site, or send it off-site to a reclamation facility so that it may be purified according to ARI Standard 700. Technicians must use U.S. EPA-approved equipment to perform the HFC or other refrigerant recovery and recycling.</li> <li>• <b>Retrofit of CFC-12 Equipment for Use with HFC-134a:</b> Regulations prohibit technicians from changing fittings on the same unit back and forth. When equipment is converted for use with a new refrigerant, the converted unit must be able to meet the applicable equipment standard set forth in the regulations. CFC-12 equipment may be permanently converted for use with HFC-134a under certain conditions. Technicians must also comply with retrofit labeling requirements.</li> <li>• <b>Technician Training and Certification:</b> Technicians who repair or service HFC-134a MVACs must be trained and certified by an EPA-approved organization. Certification is obtained by passing an EPA-approved examination. If a technician is already trained and certified to handle CFC-12, he does not need to be recertified to handle HFC-134a.</li> <li>• <b>Safe Disposal Requirements:</b> When refrigeration and air conditioning equipment enters the waste stream, the final person in the disposal chain must remove (or make certain that their customers have removed) the HFCs or other refrigerants prior to appliance disposal.</li> <li>• <b>Recordkeeping Requirements:</b> MVAC service shops must maintain records of the names and addresses of facilities to which the HFCs or other refrigerants they recover are sent. Service shops are also required to maintain records (on-site) showing that all service technicians are properly certified and must certify to EPA that they own approved equipment.</li> </ul> <p>Additional information:</p> <ol style="list-style-type: none"> <li>1. Motor vehicle disposal facility operators and certified automotive service technicians can, under certain conditions, recycle and resell HFCs and other refrigerants recovered from motor vehicles destined for disposal. Specifically, EPA permits the transportation of recovery and recycling equipment from MVAC service facilities where they are usually stored and used, to other motor vehicle service locations (which would include auto body shops, farms, mines, and quarries) in order to perform refrigerant servicing, and to salvage facilities in order to recover refrigerant.</li> <li>2. Quick-lubes and other facilities that charge HFCs and other refrigerant into vehicles but do not perform any other kind of refrigerant servicing or repair (i.e., facilities that "top off" only) are considered to be performing service involving refrigerant, and are therefore subject to all the requirements of the section 609 regulations, including the requirement that they must be certified and purchase approved equipment.</li> </ol>	

3. Technicians must recycle HFCs and other refrigerants prior to recharging it into a vehicle, even if the vehicle is the same vehicle from which the HFC or other refrigerant was extracted.
4. Section 609 certified technicians who recover HFCs or other refrigerants from motor vehicles located at disposal facilities are allowed to take the HFC or other refrigerant off-site and recycle that gas at their service facilities for reuse in other motor vehicles.
5. Owners or operators of motor vehicle disposal facilities are permitted to sell HFCs or other refrigerants recovered from such vehicles to section 609 certified technicians for re-use in MVACs.

**Resources**

- U.S. EPA. Section 609 of the Clean Air Act: Motor Vehicle Air Conditioning. Available online at: [http://www.epa.gov/ozone/title6/downloads/Section\\_609\\_FactSheet2013.pdf](http://www.epa.gov/ozone/title6/downloads/Section_609_FactSheet2013.pdf). Accessed April 2013.
- U.S. EPA. 2013. "Motor Vehicle Air Conditioning." Available online at: <http://epa.gov/ozone/title6/609/>. Accessed April 2013.
- U.S. EPA. 2010. "EPA's Final Rule Governing Substitutes for CFC-12 Refrigerant in MVACs". Available online at: <http://epa.gov/ozone/title6/609/subsumm.html>. Accessed April 2013.
- U.S. EPA. 2010. Just the Facts for MVACs: EPA Regulatory Requirements for Servicing of Motor Vehicle Air Conditioners. Available online at: <http://www.epa.gov/ozone/title6/609/justfax.html>. Accessed April 2013.
- U.S. EPA. 1997. Federal Register. Vol. 62, No. 249. Available online at: <http://www.gpo.gov/fdsys/pkg/FR-1997-12-30/pdf/97-33738.pdf>. Accessed April 2013.

*(The information above was reviewed or provided by the government.)*

<b>Country</b>	United States
<b>Name of Policy</b>	Greenhouse Gas Reporting Program (40 CFR Part 98)
<b>Governing Body</b>	U.S. EPA
<b>National Contact Office</b>	U.S. EPA: Climate Change Division, Office of Atmospheric Programs
<b>Date of Implementation</b>	October 30, 2009
<b>Type of Policy</b>	
<input type="checkbox"/> Taxes, Levies, and Other Types of Fees	<input type="checkbox"/> Required Practices
<input type="checkbox"/> Economic and Market-Based Incentives	<input type="checkbox"/> Import/Export Licensing
<input type="checkbox"/> Prohibition/Authorization	<input checked="" type="checkbox"/> Reporting/Recordkeeping Requirements
<b>Overview</b>	
<p>This regulation establishes mandatory annual GHG monitoring and reporting requirements for certain owners, operators, and suppliers of facilities that emit HFCs, or other GHGs. For suppliers, the HFCs or other GHGs reported are the quantity that would be emitted from combustion or use of the products supplied. Some of the reporting requirements under this regulation that pertain to HFCs are listed below.</p> <ul style="list-style-type: none"> <li>• Under <b>Fluorinated Gas Production</b> (Subpart L of 40 CFR Part 98), facilities must annually report the amount of HFC emitted from production, transformation, destruction, and venting of residual quantities.</li> <li>• Under <b>HCFC-22 Production and HFC-23 Destruction</b> (Subpart O of 40 CFR Part 98), facility reporting requirements include HFC-23 emissions from HCFC-22 production processes and HFC-23 destruction processes, the quantity of HFC-23 destroyed, and a one-time report including the information for the destruction process.</li> <li>• Under <b>Suppliers of Industrial Greenhouse Gases</b> (Subpart OO of 40 CFR Part 98), any facility that produces any quantity of HFC must report on the HFC produced, imported, exported, transformed, or destroyed by the facility during the calendar year. Importers and exporters of HFCs are required to report their imports and exports if, at the corporate level, either their imports or their exports contained a total of 25,000 metric tons of carbon dioxide equivalent (metric tons CO<sub>2</sub>e) or more of fluorinated GHGs.</li> <li>• <b>Importers and Exporters of Equipment Pre-charged with Fluorinated GHGs or Containing Fluorinated GHGs in Closed-cell Foams</b> (Subpart QQ of 40 CFR Part 98) must report annually on the quantity of each HFC contained in pre-charged equipment or closed-cell foams imported or exported during the calendar year. Importers and exporters of HFCs are required to report their imports and exports if, at the corporate level, either their imports or their exports contained a total of 25,000 metric tons CO<sub>2</sub>e or more of fluorinated GHGs.</li> </ul>	
<b>Resources</b>	
<ul style="list-style-type: none"> <li>• U.S. EPA. 2012. Electronic Code of Federal Regulations. "Part 98—Mandatory Greenhouse Gas Reporting". Available online at: <a href="http://www.ecfr.gov/cgi-bin/text-idx?c=ecfr&amp;SID=4d986c9d4363035159311c6c8786f831&amp;rgn=div5&amp;view=text&amp;node=40:22.0.1.1.3&amp;idn=40#40:22.0.1.1.3.1.1.1">http://www.ecfr.gov/cgi-bin/text-idx?c=ecfr&amp;SID=4d986c9d4363035159311c6c8786f831&amp;rgn=div5&amp;view=text&amp;node=40:22.0.1.1.3&amp;idn=40#40:22.0.1.1.3.1.1.1</a>. Accessed May 2013.</li> <li>• U.S. EPA. 2009. Federal Register. Vol. 74, No. 209. Available online at: <a href="http://www.gpo.gov/fdsys/pkg/FR-2011-09-15/pdf/2011-20740.pdf">http://www.gpo.gov/fdsys/pkg/FR-2011-09-15/pdf/2011-20740.pdf</a>. Accessed May 2013.</li> <li>• U.S. EPA. 2010. Federal Register. Vol. 75, No. 230. Available online at: <a href="http://www.gpo.gov/fdsys/pkg/FR-2010-12-01/pdf/2010-28803.pdf">http://www.gpo.gov/fdsys/pkg/FR-2010-12-01/pdf/2010-28803.pdf</a>. Accessed May 2013.</li> </ul> <p><i>(The information above was reviewed or provided by the government.)</i></p>	

<b>Country</b>	<b>United States</b>
<b>Name of Policy</b>	<b>2012 to 2016 Model Years Light-Duty Vehicle Greenhouse Gas Emissions and Corporate Average Fuel Economy Standards</b>
<b>Governing Body</b>	U.S. EPA; NHTSA
<b>National Contact Office</b>	U.S. EPA: Assessment and Standards Division, Office of Transportation and Air Quality NHTSA: Office of Chief Counsel
<b>Date of Implementation</b>	July 6, 2010
<b>Type of Policy</b>	
<input type="checkbox"/> Taxes, Levies, and Other Types of Fees	<input checked="" type="checkbox"/> Required Practices
<input checked="" type="checkbox"/> Economic and Market-Based Incentives	<input type="checkbox"/> Import/Export Licensing
<input type="checkbox"/> Prohibition/Authorization	<input type="checkbox"/> Reporting/Recordkeeping Requirements
<b>Overview</b>	
<p>Under this policy, EPA established the first-ever national greenhouse gas (GHG) emissions standards under the Clean Air Act, and NHTSA established the Corporate Average Fuel Economy (CAFE) standards under the Energy Policy and Conservation Act. The standards apply to new passenger cars, light-duty trucks, and medium-duty passenger vehicles, covering model years 2012 through 2016. The EPA GHG standards require these vehicles to meet an estimated combined average emissions level of 250 grams of carbon dioxide (CO<sub>2</sub>) per mile in model year 2016, equivalent to 35.5 miles per gallon (mpg) if the automotive industry were to meet this CO<sub>2</sub> level all through fuel economy improvements. NHTSA also adopted new CAFE standards which would lead to an estimated fleet average level of 34.1 mpg (6.9 L/100km) in 2016. The difference between the EPA and NHTSA standards lies mostly in the air conditioning technologies manufacturers are projected to use.</p> <p>Manufacturers can meet the GHG emission standards through a system of averaging, banking, and trading (ABT) of credits. One option to earn credits is to reduce HFC emissions from the vehicle air conditioning systems. For example, manufacturers may apply technologies that reduce the system HFC refrigerant losses (i.e. system leakage), improve the system efficiency, or adopt a system that uses an alternative to HFCs that have a lower GWP.</p>	
<b>Resources</b>	
<ul style="list-style-type: none"> <li>U.S. EPA. 2012. "Regulations &amp; Standards: Light-Duty". Available online at: <a href="http://epa.gov/otaq/climate/regs-light-duty.htm#new1">http://epa.gov/otaq/climate/regs-light-duty.htm#new1</a>. Accessed April 2013.</li> </ul> <p><i>(The information above was reviewed or provided by the government.)</i></p>	

<b>Country</b>	<b>United States</b>
<b>Name of Policy</b>	<b>2017 and Later Model Years Light-Duty Vehicle Greenhouse Gas Emissions and Corporate Average Fuel Economy Standards</b>
<b>Governing Body</b>	U.S. EPA; NHTSA
<b>National Contact Office</b>	U.S. EPA: Assessment and Standards Division, Office of Transportation and Air Quality NHTSA: Office of Chief Counsel
<b>Date of Implementation</b>	December 14, 2012
<b>Type of Policy</b>	
<input type="checkbox"/> Taxes, Levies, and Other Types of Fees	<input checked="" type="checkbox"/> Required Practices
<input checked="" type="checkbox"/> Economic and Market-Based Incentives	<input type="checkbox"/> Import/Export Licensing
<input type="checkbox"/> Prohibition/Authorization	<input type="checkbox"/> Reporting/Recordkeeping Requirements
<b>Overview</b>	
<p>NHTSA and EPA finalized passenger light-duty vehicles fuel economy and GHG emissions standards for model years 2017 and beyond, building from the standards placed for model years 2012-2016. EPA established standards that require, on an average industry fleet wide basis, 163 grams per mile of carbon dioxide (CO<sub>2</sub>) in model year 2025, which is equivalent to 54.5 miles per gallon (mpg). Like for earlier model years, manufacturers can meet the GHG emission standards through a system of averaging, banking, and trading (ABT) of credits. One option to earn credits is to reduce HFC emissions from the vehicle air conditioning systems. For example, manufacturers may apply technologies that reduce the system HFC refrigerant losses (i.e. system leakage), improve the system efficiency, or adopt a system that uses an alternative to HFCs that have a lower GWP. The maximum total A/C credits available for cars will be 18.8 grams per mile CO<sub>2</sub>-equivalent and 24.4 grams per mile for trucks CO<sub>2</sub>-equivalent. The approaches used to calculate credits for direct and indirect HFC air conditioning system improvement are generally consistent with those of the MYs 2012–2016 program, although there are several revisions. Most notably, a new test for system efficiency, optional under the GHG program starting in MY 2014, will be used exclusively in MY 2017 and beyond.</p>	
<b>Resources</b>	
<ul style="list-style-type: none"> <li>• U.S. EPA. 2012. “EPA and NHTSA Set Standards to Reduce Greenhouse Gases and Improve Fuel Economy for Model Years 2017-2025 Cars and Light Trucks.” Available online at: <a href="http://www.epa.gov/oms/climate/documents/420f12051.pdf">http://www.epa.gov/oms/climate/documents/420f12051.pdf</a>. Accessed April 2013.</li> <li>• U.S. EPA. 2012. Federal Register. Vol. 77, No. 199. Available online at: <a href="http://www.gpo.gov/fdsys/pkg/FR-2012-10-15/pdf/2012-21972.pdf">http://www.gpo.gov/fdsys/pkg/FR-2012-10-15/pdf/2012-21972.pdf</a>. Accessed April 2013.</li> <li>• U.S. EPA. 2012. “Regulations &amp; Standards: Light-Duty”. Available online at: <a href="http://epa.gov/otaq/climate/regs-light-duty.htm">http://epa.gov/otaq/climate/regs-light-duty.htm</a>. Accessed April 2013.</li> </ul> <p><i>(The information above was reviewed or provided by the government.)</i></p>	

<b>Country</b>	United States
<b>Name of Policy</b>	Greenhouse Gas Emissions Standards and Fuel Efficiency Standards for Medium- and Heavy-Duty Engines and Vehicles
<b>Governing Body</b>	U.S. EPA; NHTSA
<b>National Contact Office</b>	U.S. EPA: Assessment and Standards Division, Office of Transportation and Air Quality NHTSA: Office of Chief Counsel
<b>Date of Implementation</b>	November 14, 2011
<b>Type of Policy</b>	
<input type="checkbox"/> Taxes, Levies, and Other Types of Fees	<input checked="" type="checkbox"/> Required Practices
<input type="checkbox"/> Economic and Market-Based Incentives	<input type="checkbox"/> Import/Export Licensing
<input type="checkbox"/> Prohibition/Authorization	<input type="checkbox"/> Reporting/Recordkeeping Requirements
<b>Overview</b>	
<p>Heavy-duty pickup trucks and vans, and combination tractors are required to meet an air conditioning leakage standard to control HFC emissions. Unlike light-duty vehicle standards, there is no credit program and averaging, banking, or trading of HFC credits.</p> <p>For systems with refrigerant capacities equal or more than 734 grams, the leakage of refrigerant from an air conditioning system may not exceed 1.50 percent per year. For systems with refrigerant capacities less than 734 grams, the leakage may not exceed 11.0 grams per year. New tractors must obtain design-based certification (no system-level testing is required). The percent leakage rate is to be calculated as:</p> $\text{Percentage leak rate} = \frac{\text{Total leak rate} \left( \frac{g}{\text{year}} \right)}{\text{Total refrigerant capacity} (g)} \times 100$ <p>If the system uses a refrigerant other than HFC-134a, the leakage rate is to be adjusted by multiplying it by the GWP of the alternate refrigerant and dividing the product by 1,430 (the GWP of HFC-134a). This adjustment is to be applied before comparing the leakage rate to the standard.</p>	
<b>Resources</b>	
<ul style="list-style-type: none"> <li>• U.S. EPA. 2012. "Regulations &amp; Standards: Heavy-Duty". Available online at: <a href="http://epa.gov/otaq/climate/regs-heavy-duty.htm">http://epa.gov/otaq/climate/regs-heavy-duty.htm</a>. Accessed April 2013.</li> <li>• U.S. EPA. 2011. Greenhouse Gas (GHG) Emission Requirements Combination Tractors and Vocational Vehicles. Available online at: <a href="http://epa.gov/otaq/climate/documents/hd-ghg-tractor-vv-workshop.pdf">http://epa.gov/otaq/climate/documents/hd-ghg-tractor-vv-workshop.pdf</a>. Accessed April 2013.</li> <li>• U.S. EPA. 2011. Greenhouse Gas (GHG) Emission Requirements Heavy-Duty Pickup Trucks and Vans. Available online at: <a href="http://epa.gov/otaq/climate/documents/hd-ghg-2b3-workshop-prestn.pdf">http://epa.gov/otaq/climate/documents/hd-ghg-2b3-workshop-prestn.pdf</a>. Accessed April 2013.</li> <li>• U.S. EPA. 2011. Federal Register. Vol. 76, No. 179. Available online at: <a href="http://www.gpo.gov/fdsys/pkg/FR-2011-09-15/pdf/2011-20740.pdf">http://www.gpo.gov/fdsys/pkg/FR-2011-09-15/pdf/2011-20740.pdf</a>. Accessed April 2013.</li> </ul> <p><i>(The information above was reviewed or provided by the government.)</i></p>	

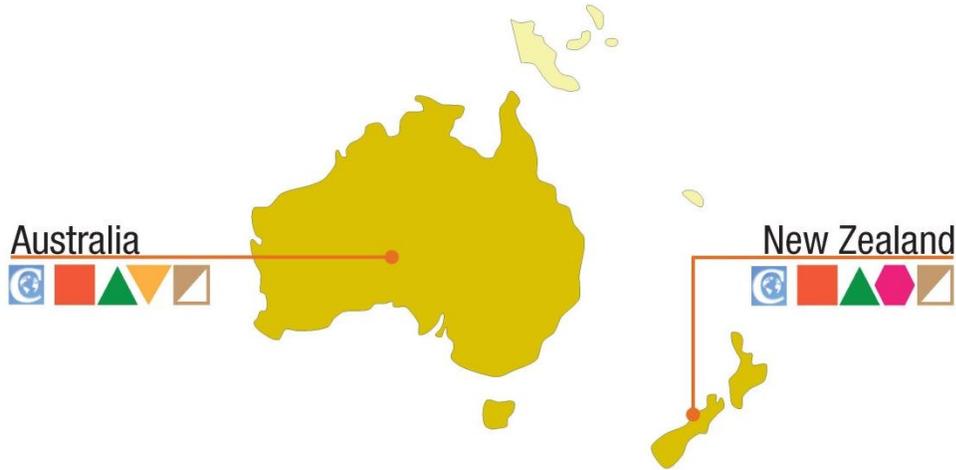
<b>Country</b>	United States
<b>Name of Policy</b>	<b>The Significant New Alternatives Policy Program</b>
<b>Governing Body</b>	U.S. EPA
<b>National Contact Office</b>	Stratospheric Protection Division, Office of Atmospheric Programs, Office of Air and Radiation (6205J)
<b>Date of Implementation</b>	April 18, 1994
<b>Type of Policy</b>	
<input type="checkbox"/> Taxes, Levies, and Other Types of Fees	<input checked="" type="checkbox"/> Required Practices
<input type="checkbox"/> Economic and Market-Based Incentives	<input type="checkbox"/> Import/Export Licensing
<input checked="" type="checkbox"/> Prohibition/Authorization	<input type="checkbox"/> Reporting/Recordkeeping Requirements
<b>Overview</b>	
<p>Under Section 612(c) of the amended Clean Air Act, proposed substitutes for Class I or Class II ozone-depleting substances are required to be evaluated to reduce the overall risk to human health and the environment.</p> <p>The U.S. Environmental Protection Agency (EPA) implements this regulation by administering the Significant New Alternatives Policy (SNAP) Program. The SNAP Program reviews proposed ODS substitutes and lists their acceptability (potentially with conditions on their use) or unacceptability in specific end-uses, which are then published in a notice or rule. Affected sectors include:</p> <ul style="list-style-type: none"> <li>• refrigeration and air conditioning,</li> <li>• solvent cleaning,</li> <li>• foam blowing,</li> <li>• aerosols,</li> <li>• fire suppression,</li> <li>• adhesives,</li> <li>• coatings and inks, and</li> <li>• sterilization.</li> </ul> <p>Review of the proposed substitute is based on atmospheric effects, exposure assessments, toxicity data, flammability, and other environmental impacts. SNAP also conducts significant outreach to stakeholders in the various sectors of use including government and non-governmental organizations, industry, military, research and testing institutes, national and international standards-setting organizations in order to support a smooth transition to the alternatives.</p> <p>The President's Climate Action Plan noted that the U.S. EPA could use its authority through the SNAP program to encourage private sector investment in low-emissions technology by approving climate-friendly alternatives as well as prohibiting the use of high-GWP substances.</p>	
<b>Resources</b>	
<ul style="list-style-type: none"> <li>• The White House, Executive Office of the President. 2013. "The President's Climate Action Plan." Available online at <a href="http://www.whitehouse.gov/sites/default/files/image/president27sclimateactionplan.pdf">http://www.whitehouse.gov/sites/default/files/image/president27sclimateactionplan.pdf</a>. Accessed January 2014.</li> <li>• U.S. EPA. 2010. "Ozone Layer Protection – Alternatives/SNAP Basic Information". Available online at <a href="http://www.epa.gov/ozone/snap/about.html#q2">http://www.epa.gov/ozone/snap/about.html#q2</a>. Accessed August 2013.</li> <li>• U.S. EPA. 1994. Federal Register. Vol. 59, No. 53. Available online at: <a href="http://www.epa.gov/ozone/fedregstr/59fr13044.html">http://www.epa.gov/ozone/fedregstr/59fr13044.html</a>. Accessed August 2013.</li> </ul>	

<b>Country</b>	United States (state: California)
<b>Name of Policy</b>	Stationary Equipment Management Program Regulation for Non-Residential Refrigeration Systems
<b>Governing Body</b>	California Air Resources Board
<b>Date of Implementation</b>	January 1, 2011
<b>Type of Policy</b>	
<input checked="" type="checkbox"/> Taxes, Levies, and Other Types of Fees	<input checked="" type="checkbox"/> Required Practices
<input type="checkbox"/> Economic and Market-Based Incentives	<input type="checkbox"/> Import/Export Licensing
<input type="checkbox"/> Prohibition/Authorization	<input checked="" type="checkbox"/> Reporting/Recordkeeping Requirements
<b>Overview</b>	
<p>As part of the AB32, the Stationary Equipment Refrigerant Management Program (SERMP) was instated. The Program reduces HFCs (and other greenhouse gas emissions) from stationary sources through: refrigerant leak detection and monitoring; leak repair; system retirement and retrofitting; reporting and recordkeeping; and proper refrigerant cylinder use, sale, and disposal. This regulation took effect on January 1, 2011, and has been phased in over time.</p> <p>The Refrigerant Management Program (RMP) regulation requires facilities with refrigeration systems with more than 50 pounds of HFCs or other high-GWP refrigerants to conduct periodic leak inspections, promptly repair leaks, and keep service records on site. Specific requirements depend on the size of the facility and size of the full refrigerant charge. The regulation also affects any person who installs, services, or disposes of any appliance using a HFCs or other high-GWP refrigerants as well as refrigerant wholesalers, distributors, and reclaimers. Facilities are also subject to registration and reporting requirements and fees based on the system's refrigerant charge size.</p> <p>The RMP is designed to: 1) reduce emissions of HFC and other high-GWP refrigerants from leaky stationary, non-residential refrigeration equipment; 2) reduce emissions from the installation and servicing of refrigeration and air-conditioning appliances using HFC and other high-GWP refrigerants; and 3) verify GHG emission reductions. The strategy of the regulation includes: registration; refrigerant leak detection and monitoring; leak repair; reporting and recordkeeping; system retrofit or retirement planning; required service practices; and refrigerant distributor, wholesaler, and reclaimer prohibitions, recordkeeping, and reporting.</p>	
<b>Resources</b>	
<ul style="list-style-type: none"> <li>CARB. Undated. "Refrigerant Management Program Regulation for Non-Residential Refrigeration Systems". Available online at: <a href="http://www.arb.ca.gov/cc/reftrack/reftrack.htm">http://www.arb.ca.gov/cc/reftrack/reftrack.htm</a>. Accessed April 2013.</li> </ul>	

<b>Country</b>	United States (state: California)
<b>Name of Policy</b>	HFC Emission Reduction Measures for Mobile Air Conditioning: Regulation for Small Containers of Automotive Refrigerant - Use and Sale
<b>Governing Body</b>	California Air Resources Board
<b>Date of Implementation</b>	January 1, 2010
<b>Type of Policy</b>	
<input type="checkbox"/> Taxes, Levies, and Other Types of Fees	<input checked="" type="checkbox"/> Required Practices
<input checked="" type="checkbox"/> Economic and Market-Based Incentives	<input type="checkbox"/> Import/Export Licensing
<input type="checkbox"/> Prohibition/Authorization	<input checked="" type="checkbox"/> Reporting/Recordkeeping Requirements
<b>Overview</b>	
<p>The California Air Resources Board (ARB) adopted a regulation to reduce HFC and other refrigerant emissions from the do-it-yourself servicing of motor vehicle air conditioners (MVAC). The regulation affects retailers who sell the product, and companies that package, distribute, or market the small cans of HFCs or other refrigerant, and the consumers who recharge MVAC systems using this product. In order to certify products for sale in California, manufacturers submit an application to ARB including information that shows their products meet these requirements. This regulation became law in the state of California on October 1, 2009 and became effective on January 1, 2010.</p> <p>This regulation applies to the sale, use, and disposal of small containers of automotive refrigerant with a GWP greater than 150, including HFCs. The regulation has four requirements:</p> <ol style="list-style-type: none"> <li>1. Use of a self-sealing valve on all small containers subject to this regulation to prevent refrigerant from venting to the atmosphere;</li> <li>2. Improved labeling on small containers, including improved instructions for use, and a statement that it is illegal to destroy or discard the container or its contents;</li> <li>3. A recycling program for used containers. The recycling program involves consumers, retailers, and manufacturers. A USD 10 deposit will be required for each container of HFCs or other automotive refrigerants at the time of purchase. Containers are required to be returned within 90 days with a valid, retailer's proof of purchase for refund of the deposit. Retailers collect all used small containers from consumers and return them to the original manufacturer for recycling. Manufacturers then recover any HFC or other refrigerant remaining in the container and recycle the can. Manufacturers, distributors, retailers (upon ARB request), and recyclers must report to ARB sales data, the number of returned containers, and the amount of HFC or other refrigerant recycled annually. The consumer deposit is adjustable and can be raised or lowered depending on whether the container recycling rates fails to meet or exceeds certain targets respectively.</li> <li>4. An education program that emphasizes best practices for vehicle recharging. The education program is administered by manufacturers and producers. It is their responsibility to develop educational brochures for distribution to consumers (through retailers) and maintain an informative website. The brochures and website must include instructions to identify and repair system leaks, best practice techniques for recharging an MVAC system, environmental hazards associated with the HFC or refrigerant, risks of overcharging or undercharging the MVAC, and a description of the recycling program.</li> </ol>	
<b>Resources</b>	
<ul style="list-style-type: none"> <li>• CARB. 2012. New Regulation for Small Containers of Automotive Refrigerant - Use and Sale. Available online at: <a href="http://www.arb.ca.gov/cc/hfc-mac/hfcdiy/references/small_container_auto_refrig.pdf">http://www.arb.ca.gov/cc/hfc-mac/hfcdiy/references/small_container_auto_refrig.pdf</a>. Accessed April 2013.</li> </ul>	

<b>Country</b>	United States (state: California)
<b>Name of Policy</b>	HFC Emission Reduction Measures for Mobile Air Conditioning: Low Emission Vehicle (LEV III), MAC Effort
<b>Governing Body</b>	California Air Resources Board
<b>Date of Implementation</b>	December 31, 2012
<b>Type of Policy</b>	
<input type="checkbox"/> Taxes, Levies, and Other Types of Fees	<input type="checkbox"/> Required Practices
<input checked="" type="checkbox"/> Economic and Market-Based Incentives	<input type="checkbox"/> Import/Export Licensing
<input type="checkbox"/> Prohibition/Authorization	<input type="checkbox"/> Reporting/Recordkeeping Requirements
<b>Overview</b>	
<p>California's Low-Emission Vehicle (LEV) regulations (including subsequent amendments) establish vehicle (passenger cars, light-duty trucks, and medium-duty passenger vehicles, and super ultra-low-emission vehicle) emission standards, as well as fleet average emission standards. LEV III applies to model-year vehicles of 2017 through 2025. Manufacturers may, in part, meet these standards by reducing HFC emissions from vehicle air conditioning systems.</p> <p>Manufacturers may generate A/C Direct Emissions Credits by implementing specific A/C system technologies designed to reduce air conditioning direct emissions over the useful life of their vehicles. The calculation of A/C Direct Emissions Credit is differs between HFC-134a vapor compression systems and low-GWP vapor compression systems. The amount of credit available for different efficiency technologies is listed in a credit menu and manufacturers may claim up to a 5.0 grams carbon dioxide-equivalent per mile (gCO<sub>2</sub>e/mile) for cars and 7.2 gCO<sub>2</sub>e/mile for trucks.</p>	
<b>Resources</b>	
<ul style="list-style-type: none"> <li>• CARB. Undated. Advanced Clean Cars Summary. Available online at: <a href="http://www.arb.ca.gov/msprog/clean_cars/acc%20summary-final.pdf">http://www.arb.ca.gov/msprog/clean_cars/acc%20summary-final.pdf</a>. Accessed April 2013.</li> <li>• CARB. 2009. LEV II - Amendments to California's Low-Emission Vehicle Regulations. Available online at: <a href="http://www.arb.ca.gov/msprog/levprog/levii/factsht.pdf">http://www.arb.ca.gov/msprog/levprog/levii/factsht.pdf</a>. Accessed April 2013.</li> </ul>	

**Pacific Island Countries**



Key	
	CCAC Partner
	Taxes, Levies, Fees
	Economic and Market-Based Incentives
	Prohibition/Authorization
	Required Practices
	Import/Export Licensing
	Reporting/Recordkeeping Requirements

## Australia

<b>Name of Policy</b>	Ozone Protection and Synthetic Greenhouse Gas Management Act 1989 (the Act)
<b>Governing Body</b>	Australian Government Department of Sustainability, Environment, Water, Population and Communities
<b>National Contact Office</b>	Department of Sustainability, Environment, Water, Population and Communities
<b>Date of Implementation</b>	July 1, 2012
<b>Type of Policy</b>	
<input checked="" type="checkbox"/> Taxes, Levies, and Other Types of Fees* <input type="checkbox"/> Required Practices <input checked="" type="checkbox"/> Economic and Market-Based Incentives <input checked="" type="checkbox"/> Import/Export Licensing <input type="checkbox"/> Prohibition/Authorization <input checked="" type="checkbox"/> Reporting/Recordkeeping Requirements *The levy will be abolished starting 1 July 2014.	
<b>Overview</b>	
<p><b>2003 Amendment to the Ozone Protection Act 1989</b>          The Ozone Protection Act of 1989 (now called the Ozone Protection and Synthetic Greenhouse Gas Management Act 1989) was amended in 2003 to cover HFCs and other synthetic greenhouse gases (SGG) used as replacements for ODS. The Act provides controls on the manufacture, import, export, and use of SGGs, but without any quotas or phase outs.</p> <p><b>2012 Amendment to the Ozone Protection and Synthetic Greenhouse Gas Management Regulations 1995 (Import/Manufacture Levy)</b>          An equivalent carbon price is applied to HFCs and other SGGs listed under the UNFCCC's Kyoto Protocol at the point of import/manufacture, including equipment or products which contain these gases. HFCs covered include: HFC-23, HFC-32, HFC-41, HFC-43-10mee, HFC-125, HFC-134, HFC-134a, HFC-143, HFC-143a, HFC-152a, HFC-227ea, HFC-236fa, and HFC-245ca. The import/manufacture levy consists of two charges:</p> <ol style="list-style-type: none"> <li>1. A cost recovery levy at a prescribed rate of AUD 165 (USD 166.65)<sup>a</sup> per metric ton of the HFC imported/manufactured to cover the administrative costs of the Ozone/SGG program.</li> <li>2. An equivalent carbon price, calculated by multiplying the global warming potential of the gas by the quantity imported/manufactured and by the equivalent carbon price current at the time of import/manufacture.</li> </ol> <p>Exemptions are provided for where it is impracticable to apply the equivalent carbon price or for medical, veterinary, health, and safety reasons.</p> <p>The import/manufacture levy commenced on July 1, 2012 with a three-year fixed price period:</p> <ul style="list-style-type: none"> <li>• AUD 23.00 (USD 20.57)<sup>a</sup> per metric ton of CO<sub>2</sub>eq. in 2012-2013</li> <li>• AUD 24.15 (USD 21.59)<sup>a</sup> per metric ton of CO<sub>2</sub>eq. in 2013-2014</li> <li>• AUD 25.40 (USD 22.71)<sup>a</sup> per metric ton of CO<sub>2</sub>eq. in 2014-2015</li> </ul> <p>In 2013, the Australian Government announced that the carbon tax (referred to as the Carbon Pricing Mechanism (CPM)) will be abolished from 1 July 2014. Draft legislation includes transitional provisions for SGG importers of HFCs and other SGGs imported after 1 April 2014. This transitional approach is intended to reduce the risk of shortages of SGGs in the period prior to 1 July 2014 that is anticipated due to a lower levy.</p> <p>The CPM will be replaced by the Emissions Reduction Fund (ERF) to regulate Australia's carbon emissions. The government released an Emission Reduction Fund Green Paper in December 2013, in which it seeks views on regulatory reform opportunities that would complement the Emissions Reduction Fund including the option to phase down the use of HFCs under the Montreal Protocol.</p> <p><b>Licenses and Reporting Requirements</b></p> <ul style="list-style-type: none"> <li>• As of July 1, 2012, a controlled substance license is required to import, export, and manufacture HFCs. The application fee is AUD15,000 (USD 15,150).<sup>a</sup></li> </ul>	

- An ODS/SGG equipment license (EQPL) is required to import equipment that contains an HFC. The application fee is AUD 3,000 (USD 2,683).<sup>a</sup> Imports containing up to five pieces of equipment with less than 10kg of gas in total may be eligible for a partial waiver of the license application fee (AUD 400).
- Holders of a controlled substance license or an equipment license are required to provide quarterly reports to the Ministry.

### **Destruction Incentives Program**

As part of the Clean Energy Future Plan, the Australian Government announced that, from July 1, 2013, incentives will be provided for the destruction of waste HFCs and other SGGs. The incentive is in addition to the incentives currently provided by the industry operated destruction system, Refrigerant Reclaim Australia. The government will provide an incentive payment of AUD 1.50 (USD 1.34)<sup>a</sup> per kilogram of HFC destroyed to refrigerant contractors.

### **Resources**

- Australian Government Department of Sustainability, Environment, Water, Population, and Communities. 2012. Compliance and Enforcement Arrangements for Synthetic Greenhouse Gases. Available at: <http://www.environment.gov.au/atmosphere/ozone/sgg/equivalentcarbonprice/publications/pubs/fs8-ecp-compliance.pdf>. Accessed April 2013.
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- Australian Government Department of Sustainability, Environment, Water, Population, and Communities. 2013. Commonwealth legislation. Available at: <http://www.environment.gov.au/atmosphere/ozone/legislation/index.html>. Accessed May 2013.
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- Australian Government Department of Sustainability, Environment, Water, Population, and Communities. 2013. Destruction Incentives Program for waste synthetic greenhouse gases and ozone depleting substances. Available at: <http://www.environment.gov.au/atmosphere/ozone/destruction-program/index.html>. Accessed May 2013.
- Australian Government Department of Sustainability, Environment, Water, Population, and Communities. 2013. Synthetic greenhouse gas levy export refund scheme. Available at: <http://www.environment.gov.au/atmosphere/ozone/sgg/equivalentcarbonprice/publications/pubs/fs12-ecp-export-refund-scheme.pdf>. Accessed May 2013.
- Australian Government Department of the Environment. 2014. Carbon tax repeal bills. Available at: <http://www.environment.gov.au/topics/cleaner-environment/clean-air/pealing-carbon-tax>. Accessed January 2014.
- Australian Government Department of the Environment. 2014. Emissions Reduction Fund. Green Paper. Available at: [http://www.environment.gov.au/system/files/resources/66237232-3042-4cd8-99a3-040705fead3b/files/erf-green-paper\\_1.pdf](http://www.environment.gov.au/system/files/resources/66237232-3042-4cd8-99a3-040705fead3b/files/erf-green-paper_1.pdf). Accessed January 2014.

*(The information above was reviewed or provided by the government.)*

<sup>a</sup> Levy expressed in USD. The exchange rate applied is 1 AUD = 0.89 USD (August 2013).

## New Zealand

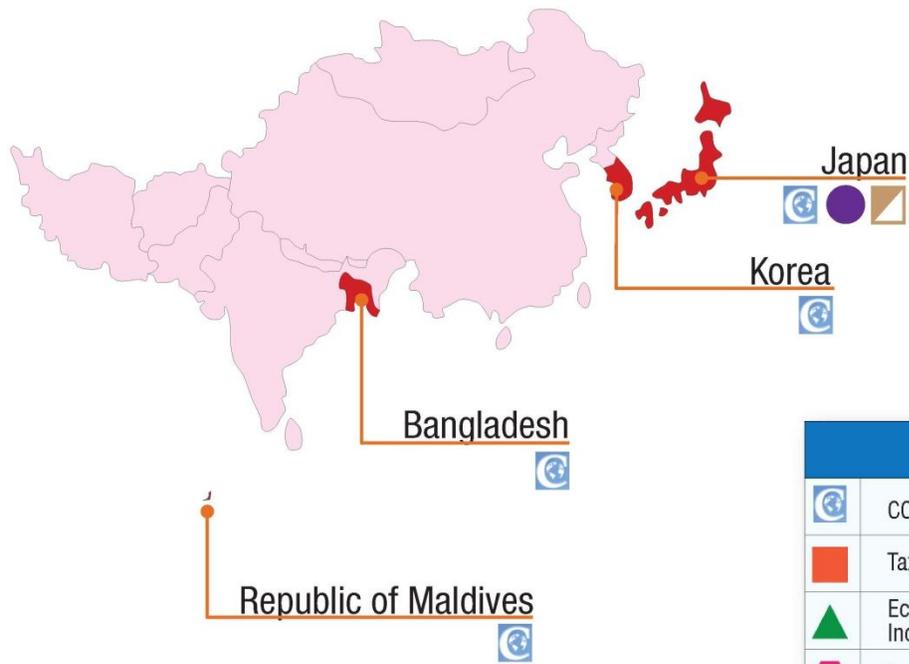
<b>Name of Policy</b>	New Zealand Emissions Trading Scheme (NZ ETS)
<b>Governing Body</b>	The Ministry of Economic Development, the Ministry of Agriculture and Forestry, and the Ministry for the Environment
<b>National Contact Office</b>	Environmental Protection Agency
<b>Date of Implementation</b>	January 1, 2011
<b>Type of Policy</b>	
<input type="checkbox"/> Taxes, Levies, and Other Types of Fees	<input type="checkbox"/> Required Practices
<input checked="" type="checkbox"/> Economic and Market-Based Incentives	<input type="checkbox"/> Import/Export Licensing
<input type="checkbox"/> Prohibition/Authorization	<input checked="" type="checkbox"/> Reporting/Recordkeeping Requirements
<b>Overview</b>	
<p>Regulations for reporting HFCs emissions under the New Zealand Emissions Trading Scheme (NZ ETS) came into force on January 1, 2011. The scheme covers all sectors and all gases (i.e., CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O, HFCs, PFCs, SF<sub>6</sub>), and reduces emissions by making emitters pay for any emissions covered under the UNFCCC's Kyoto Protocol.</p> <p>The obligation for people who import HFC in bulk is set out in the <b>Climate Change (Stationary Energy and Industrial Processes) Amendment Regulations 2010</b>. Under the regulations, persons who manufacture or import HFCs in bulk are required to participate in the NZ ETS. In addition, persons who manufacture or import HFCs in bulk are required to report to the New Zealand government. Eligibility to receive emission credits began on January 1, 2013.</p> <p>The <b>Climate Change (Other Removal Activities) Amendment Regulations 2010</b> prescribes the ability for exporters of HFCs to earn New Zealand Units (NZUs). Those who export or destroy HFCs, either in bulk or in equipment, may voluntarily participate in the NZ ETS. The calculation of emissions 'removed' from those activities must be carried out in accordance with the <b>Climate Change (Other Removal Activities) Regulations 2009</b> and <b>Climate Change (Other Removal Activities) Amendment Regulations 2012</b>.</p>	
<b>Resources</b>	
<ul style="list-style-type: none"> <li>Ministry for the Environment, Government of New Zealand. New Zealand's Fifth National Communication. Annex C: Summary of Policies and Measures. Available at: <a href="http://www.mfe.govt.nz/publications/climate/nz-fifth-national-communication/page13.html">http://www.mfe.govt.nz/publications/climate/nz-fifth-national-communication/page13.html</a>. Accessed April 2013.</li> <li>Ministry for the Environment, Government of New Zealand. 2013. Synthetic Greenhouse Gases in the ETS. Available at: <a href="http://www.climatechange.govt.nz/emissions-trading-scheme/participating/synthetic-gases/">http://www.climatechange.govt.nz/emissions-trading-scheme/participating/synthetic-gases/</a>. Accessed April 2013.</li> </ul>	

<b>Country</b>	New Zealand
<b>Name of Policy</b>	Climate Change (Synthetic Greenhouse Gas Levies) Regulations 2013
<b>Governing Body</b>	Ministry for the Environment
<b>National Contact Office</b>	Environmental Protection Agency
<b>Date of Implementation</b>	These regulations come into force on July 1, 2013
<b>Type of Policy</b>	
<input checked="" type="checkbox"/> Taxes, Levies, and Other Types of Fees	<input type="checkbox"/> Required Practices
<input type="checkbox"/> Economic and Market-Based Incentives	<input type="checkbox"/> Import/Export Licensing
<input type="checkbox"/> Prohibition/Authorization	<input type="checkbox"/> Reporting/Recordkeeping Requirements
<b>Overview</b>	
<p>From July 1, 2013, importers of HFC (and PFC) in goods and motor vehicles will face a carbon price through a levy. The levy on motor vehicles will apply when a motor vehicle is first registered for on-road use in New Zealand (when a car receives its license plates). This part of the levy will be administered by the New Zealand Transport Agency (NZTA). The levy on all other goods that contain HFCs (and PFC) will apply at import and will be administered by the New Zealand Customs Service (Customs).</p> <p>Climate Change (General Exemptions) Amendment Order 2010 sets out exemptions from the levy and the NZ ETS. These regulations are currently being amended to remove the exemption for HFC-245fa and HFC-365mfc.</p>	
<b>Resources</b>	
<ul style="list-style-type: none"> <li>• Ministry for the Environment, Government of New Zealand. New Zealand's Fifth National Communication. Annex C: Summary of Policies and Measures. Available at: <a href="http://www.mfe.govt.nz/publications/climate/nz-fifth-national-communication/page13.html">http://www.mfe.govt.nz/publications/climate/nz-fifth-national-communication/page13.html</a>. Accessed April 2013.</li> <li>• Ministry for the Environment, Government of New Zealand. 2013. Synthetic Greenhouse Gases in the ETS. Available at: <a href="http://www.climatechange.govt.nz/emissions-trading-scheme/participating/synthetic-gases/">http://www.climatechange.govt.nz/emissions-trading-scheme/participating/synthetic-gases/</a>. Accessed April 2013.</li> <li>• Parliamentary Counsel Office, Government of New Zealand. 2013. Climate Change (Synthetic Greenhouse Gas Levies) Regulations 2013. Available at: <a href="http://www.legislation.govt.nz/regulation/public/2013/0046/latest/DLM5093456.html">http://www.legislation.govt.nz/regulation/public/2013/0046/latest/DLM5093456.html</a>. Accessed April 2013.</li> <li>• Parliamentary Counsel Office, Government of New Zealand. 2013. Climate Change (Synthetic Greenhouse Gas Levies) Regulations 2013. Available at: <a href="http://www.legislation.govt.nz/regulation/public/2013/0046/latest/whole.html#TMPN11DC3">http://www.legislation.govt.nz/regulation/public/2013/0046/latest/whole.html#TMPN11DC3</a>. Accessed April 2013.</li> <li>• Parliamentary Counsel Office, Government of New Zealand. 2010. Climate Change (General Exemptions) Amendment Order 2010. Available at: <a href="http://www.legislation.govt.nz/regulation/public/2010/0339/latest/DLM3252634.html">http://www.legislation.govt.nz/regulation/public/2010/0339/latest/DLM3252634.html</a>. Accessed April 2013.</li> </ul>	

<b>Country</b>	New Zealand
<b>Name of Policy</b>	Climate Change Response Act 2002 (CCRA)
<b>Governing Body</b>	Ministry for the Environment
<b>National Contact Office</b>	Environmental Protection Agency
<b>Date of Implementation</b>	2002
<b>Type of Policy</b>	
<input type="checkbox"/> Taxes, Levies, and Other Types of Fees	<input checked="" type="checkbox"/> Required Practices
<input type="checkbox"/> Economic and Market-Based Incentives	<input type="checkbox"/> Import/Export Licensing
<input checked="" type="checkbox"/> Prohibition/Authorization	<input type="checkbox"/> Reporting/Recordkeeping Requirements
<b>Overview</b>	
<p>Under the Climate Change Response Act 2002 (CCRA), New Zealand has banned the willful release of HFCs (and other synthetic greenhouse gases (SGGs)) from particular sources and activities.</p> <p>Persons who knowingly, or without lawful justification or excuse, release HFCs into the atmosphere while installing, operating, servicing, modifying or dismantling refrigeration or air-conditioning equipment or other heat-transfer medium, will be penalized. Offenders can be fined up to NZD 50,000 (USD 38,7 00)<sup>a</sup> for willfully releasing HFCs (or other SGGs) into the atmosphere. However, persons would not be penalized if:</p> <ul style="list-style-type: none"> <li>• The HFC (or other SGG) is leaked into the atmosphere slowly over the natural course of a product's life; or</li> <li>• The HFC (or other SGG) is released during servicing where the best industry practice was being exercised.</li> </ul>	
<b>Resources</b>	
<ul style="list-style-type: none"> <li>• Ministry for the Environment, Government of New Zealand. New Zealand's Fifth National Communication. Annex C: Summary of Policies and Measures. Available at: <a href="http://www.mfe.govt.nz/publications/climate/nz-fifth-national-communication/page13.html">http://www.mfe.govt.nz/publications/climate/nz-fifth-national-communication/page13.html</a>. Accessed April 2013.</li> <li>• Ministry for the Environment, Government of New Zealand. 2013. Synthetic Greenhouse Gases in the ETS. Available at: <a href="http://www.climatechange.govt.nz/emissions-trading-scheme/participating/synthetic-gases/">http://www.climatechange.govt.nz/emissions-trading-scheme/participating/synthetic-gases/</a>. Accessed April 2013.</li> </ul>	

<sup>a</sup>Based on an exchange rate of 1 NZD = 0.77 USD (August 2013).

South Asia



Key	
	CCAC Partner
	Taxes, Levies, Fees
	Economic and Market-Based Incentives
	Prohibition/Authorization
	Required Practices
	Import/Export Licensing
	Reporting/Recordkeeping Requiements

## Japan

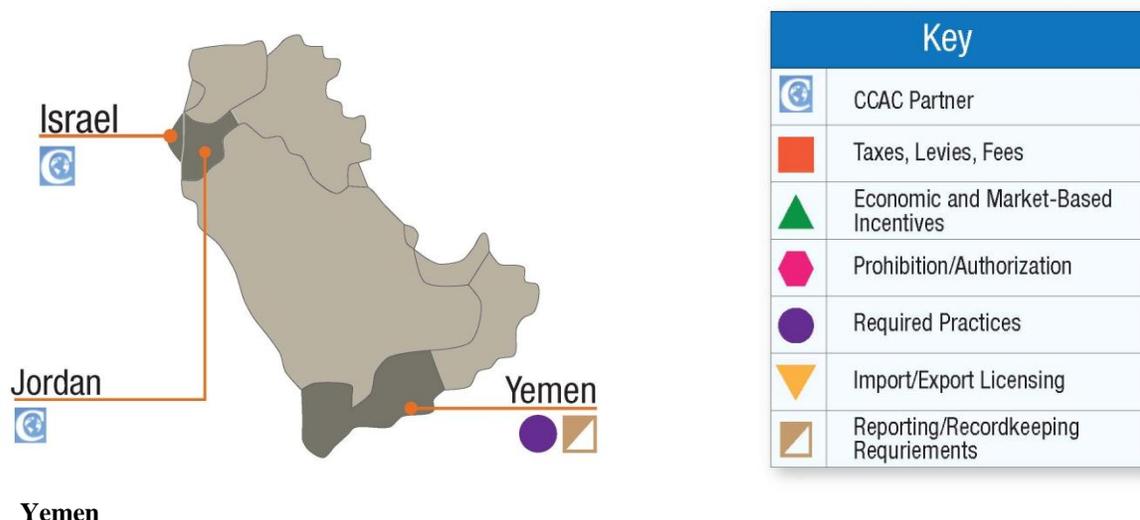
<b>Country</b>	Japan
<b>Name of Policy</b>	Fluorocarbons Recovery and Destruction Law (currently under revision)
<b>Governing Body</b>	Ministry of Economy, Trade, and Industry (METI)
<b>National Contact Office</b>	Fluoride Gases Management Office, Chemical Management Policy Division, Manufacturing Industries Bureau
<b>Date of Implementation</b>	2002 (Amended in June 2006 and is currently under revision)
<b>Type of Policy</b>	
<input type="checkbox"/> Taxes, Levies, and Other Types of Fees	<input checked="" type="checkbox"/> Required Practices
<input type="checkbox"/> Economic and Market-Based Incentives	<input type="checkbox"/> Import/Export Licensing
<input type="checkbox"/> Prohibition/Authorization	<input type="checkbox"/> Reporting/Recordkeeping Requirements
<b>Overview</b>	
<p>The Fluorocarbons Recovery and Destruction Law aims to limit emissions of HFCs into the atmosphere by providing guidance for recovery and destruction of refrigerants from commercial refrigeration and air conditioning systems during servicing and at end of life to ensure proper destruction.</p> <p>The law requires end users of commercial refrigerators and air-conditioners to ensure the recovery of HFC refrigerants from the equipment during the servicing and at the end of life by recovery operators. Recovery operators are required to ensure the destruction of the recovered refrigerant, unless they reuse the substance. Destruction operators are required to collect fluorocarbons from recovery operators and destruct in accordance with the destruction standards. Recovery operators and destruction operators must be registered, obtain permits, and report annually on quantities destroyed to the government. The codes of practice regarding recovery and transfer of fluorocarbons must be followed during maintenance, servicing, and disposal.</p> <p>On April 19, 2013, the Cabinet approved a Bill to partially revise the Fluorocarbons Recovery and Destruction Law. This revision will strengthen emissions reduction of HFCs at each stage of their life-cycle from production to destruction. Revisions to the Fluorocarbons Recovery and Destruction Law include:</p> <ul style="list-style-type: none"> <li>• Manufacturers and importers of HFCs will phase down use of HFCs by transitioning to alternatives with no or low-GWP and/or by recycling recovered HFCs.</li> <li>• Manufacturers of products and equipment containing HFCs will transition from HFCs to products and equipment with no or low-GWP alternatives by a target year.</li> <li>• HFC product and equipment users (e.g., supermarkets) will conduct periodic leakage checks and report annual leakage quantities to the government to promote containment of HFCs in commercial equipment.</li> <li>• Service and recovery operators for commercial refrigeration and air conditioning systems will be registered and approved by the government to ensure proper management of HFCs during servicing and end-of-life.</li> </ul>	
<b>Resources</b>	
<ul style="list-style-type: none"> <li>• Ministry of the Environment, Government of Japan. 2001. Summary of Japan's Law Concerning the Recovery and Destruction of Fluorocarbons (Fluorocarbons Recovery and Destruction Law). Available at: <a href="http://www.env.go.jp/en/laws/global/ozone1.pdf">http://www.env.go.jp/en/laws/global/ozone1.pdf</a>. Accessed April 2013.</li> <li>• Ministry of the Environment, Government of Japan. Japan's Measures for the Emission Control of Fluorinated Gases. Available at: <a href="http://ozone.unep.org/Meeting_Documents/oewg/30oewg/conf-ngos/Japan-02MOEJ-30OEWG%20Takahashi.pdf">http://ozone.unep.org/Meeting_Documents/oewg/30oewg/conf-ngos/Japan-02MOEJ-30OEWG%20Takahashi.pdf</a>. Accessed April 2013.</li> <li>• Ministry of the Environment, Government of Japan. 2013. Cabinet Decision on the Bill for the Act of Partial Revision of the Act on Ensuring the Implementation of Recovery and Destruction of Fluorocarbons concerning Designated Products. Available at: <a href="http://www.meti.go.jp/english/press/2013/0419_01.html">http://www.meti.go.jp/english/press/2013/0419_01.html</a>. Accessed May 2013.</li> </ul> <p><i>(The information above was reviewed or provided by the government.)</i></p>	

<b>Country</b>	Japan
<b>Name of Policy</b>	Home Appliance Recycling Law
<b>Governing Body</b>	Ministry of Economy, Trade, and Industry (METI)
<b>National Contact Office</b>	Information and Communication Electronics Division: Commerce and Information Policy Bureau
<b>Date of Implementation</b>	April 2001
<b>Type of Policy</b>	
<input type="checkbox"/> Taxes, Levies, and Other Types of Fees	<input checked="" type="checkbox"/> Required Practices
<input type="checkbox"/> Economic and Market-Based Incentives	<input type="checkbox"/> Import/Export Licensing
<input type="checkbox"/> Prohibition/Authorization	<input type="checkbox"/> Reporting/Recordkeeping Requirements
<b>Overview</b>	
<p>The Home Appliance Recycling Law (formerly the Specified Home Appliance Recycling Law) entered into force in April 2001 and applies to HFC-containing household air conditioners, refrigerators, freezers, and other appliances. The law requires consumers to pay for the collection, transportation, and recycling of the appliances at the time of disposal. Retailers must (1) take back a similar used produce from consumers every time they sell a product, and (2) bring it to take-back site designated by the manufacturer for recycling. Manufacturers are required to meet recycling targets (depending on the appliance) and to collect the HFCs (and other fluorocarbons) from air conditioners and refrigerators.</p>	
<b>Resources</b>	
<ul style="list-style-type: none"> <li>• Ministry of Economy, Trade, and Industry, Government of Japan. 1998. Home Appliance Recycling Law. Available at: <a href="http://www.meti.go.jp/policy/recycle/main/english/law/home.html">http://www.meti.go.jp/policy/recycle/main/english/law/home.html</a>. Accessed April 2013.</li> <li>• Ministry of the Environment, Government of Japan. Japan's Measures for the Emission Control of Fluorinated Gases. Available at: <a href="http://ozone.unep.org/Meeting_Documents/oewg/30oewg/conf-ngos/Japan-02MOEJ-30OEWG%20Takahashi.pdf">http://ozone.unep.org/Meeting_Documents/oewg/30oewg/conf-ngos/Japan-02MOEJ-30OEWG%20Takahashi.pdf</a>. Accessed April 2013.</li> </ul> <p><i>(The information above was reviewed or provided by the government.)</i></p>	

<b>Country</b>	Japan
<b>Name of Policy</b>	End-of-Life Vehicle Law
<b>Governing Body</b>	Ministry of Economy, Trade, and Industry (METI)
<b>National Contact Office</b>	Automobile Division, Manufacturing Industries Bureau
<b>Date of Implementation</b>	2005
<b>Type of Policy</b>	
<input type="checkbox"/> Taxes, Levies, and Other Types of Fees	<input checked="" type="checkbox"/> Required Practices
<input type="checkbox"/> Economic and Market-Based Incentives	<input type="checkbox"/> Import/Export Licensing
<input type="checkbox"/> Prohibition/Authorization	<input type="checkbox"/> Reporting/Recordkeeping Requirements
<b>Overview</b>	
<p>The End-of-Life Vehicle (ELV) Law aims at recycling of vehicle components and recovery of HFCs (and other F-gases as well as ODS) from mobile air conditioning systems. The Japan Auto Recycling Partnership Center facilitates the collection and destruction of HFCs (i.e., HFC-134a).</p> <p>Responsibilities of the parties concerned includes:</p> <ul style="list-style-type: none"> <li>• Car owners (end users) must pay a recycling fee and deliver end-of-life vehicles to ELV-collecting businesses that are registered with local authorities;</li> <li>• Collecting businesses must take back ELVs from end users and then deliver them to a fluorocarbon recovery business;</li> <li>• Fluorocarbon recovery businesses must collect fluorocarbons in accordance with the recycling standards; and</li> <li>• Car manufacturers/importers must collect and destroy fluorocarbons that are manufactured and imported by themselves.</li> </ul> <p>Recycling fees are determined by individual car manufacturers/importers and must be disclosed upon purchase of a new car.</p>	
<b>Resources</b>	
<ul style="list-style-type: none"> <li>• Ministry of the Environment, Government of Japan. Japan's Measures for the Emission Control of Fluorinated Gases. Available at: <a href="http://ozone.unep.org/Meeting_Documents/oewg/30oewg/conf-ngos/Japan-02MOEJ-30OEWG%20Takahashi.pdf">http://ozone.unep.org/Meeting_Documents/oewg/30oewg/conf-ngos/Japan-02MOEJ-30OEWG%20Takahashi.pdf</a>. Accessed April 2013.</li> <li>• Ministry of Economy, Trade, and Industry, Government of Japan. 2005. The Recovery of Fluorocarbons from the End-of-Life Vehicles (ELVs) In Japan. Available at: <a href="http://www.arb.ca.gov/carbis/research/macs2005/pres4.pdf">http://www.arb.ca.gov/carbis/research/macs2005/pres4.pdf</a>. Accessed April 2013.</li> <li>• Ministry of Economy, Trade, and Industry, Government of Japan. 1998. Home Appliance Recycling Law. Available at: <a href="http://www.meti.go.jp/policy/recycle/main/english/law/home.html">http://www.meti.go.jp/policy/recycle/main/english/law/home.html</a>. Accessed April 2013.</li> </ul> <p><i>(The information above was reviewed or provided by the government.)</i></p>	

<b>Country</b>	Japan
<b>Name of Policy</b>	Act on Promotion of Global Warming Countermeasures (Act No. 117 of October 9, 1998)
<b>Governing Body</b>	Ministry of Economy, Trade, and Industry (METI) and Ministry of the Environment (MOE)
<b>National Contact Office</b>	Climate Change Policy Division, Global Environment Bureau
<b>Date of Implementation</b>	1998
<b>Type of Policy</b>	
<input type="checkbox"/> Taxes, Levies, and Other Types of Fees	<input type="checkbox"/> Required Practices
<input type="checkbox"/> Economic and Market-Based Incentives	<input type="checkbox"/> Import/Export Licensing
<input type="checkbox"/> Prohibition/Authorization	<input checked="" type="checkbox"/> Reporting/Recordkeeping Requirements
<b>Overview</b>	
<p>The Act on Promotion of Global Warming Countermeasures establishes a mandatory greenhouse gas accounting and reporting system under which parties that emit considerably large amounts of HFCs and other greenhouse gases must calculate and report their annual emissions to the government. These emissions are then published.</p> <p>Reporting entities of HFCs must meet the following conditions:</p> <ul style="list-style-type: none"> <li>• Parties whose total emissions across all business establishments for each type of greenhouse gas is at least 3,000 metric tons of CO<sub>2</sub>-eq.</li> <li>• Parties with at least 21 full-time employees in their overall business.</li> </ul> <p>If a party meets these requirements, it must report the emissions of the establishment as a breakdown across all HFCs and other greenhouse gases.</p> <p>This reporting system aims to establish a basis for voluntary action, where emitters can calculate their own emissions. Emissions are published to encourage and motivate the general public and business operated to take voluntary actions to reduce their HFC and other greenhouse gas emissions.</p>	
<b>Resources</b>	
<ul style="list-style-type: none"> <li>• Ministry of the Environment, Government of Japan. 1998. Act on Promotion of Global Warming Countermeasures. Act No. 117 of October 9, 1998. Amended Act No. 57 of 2006. Available at: <a href="http://www.cas.go.jp/jp/seisaku/hourei/data/APGWC.pdf">http://www.cas.go.jp/jp/seisaku/hourei/data/APGWC.pdf</a>. Accessed May 2013.</li> </ul> <p><i>(The information above was reviewed or provided by the government.)</i></p>	

## West Asia



<b>Name of Policy</b>	Ozone regulations
<b>Governing Body</b>	Environmental Protection Authority
<b>National Contact Office</b>	
<b>Date of Implementation</b>	
<b>Type of Policy</b>	
<input type="checkbox"/> Taxes, Levies, and Other Types of Fees	<input checked="" type="checkbox"/> Required Practices
<input type="checkbox"/> Economic and Market-Based Incentives	<input type="checkbox"/> Import/Export Licensing
<input type="checkbox"/> Prohibition/Authorization	<input checked="" type="checkbox"/> Reporting/Recordkeeping Requirements
<b>Overview</b>	
<p>Yemen Ozone Regulations require the following:</p> <ul style="list-style-type: none"> <li>• Annual reporting on HFCs importation by importers;</li> <li>• Labeling by importers; and</li> <li>• Recovery and recycling by maintenance workshops.</li> </ul> <p>Yemen also agreed in principle on an HFC phase-down under the Montreal Protocol rather than an emission reduction under the UNFCCC and its Kyoto Protocol.</p>	
<b>Resources</b>	
<i>(The information above was reviewed or provided by the government.)</i>	

## 4. Proposed HFC Policies

### Canada

**End-of-Life Regulations.** Environment Canada will be drafting regulations to manage the end-of-life of HFCs (as well as ODS and other halocarbon alternatives). The proposed regulations may require importers, manufacturers, distributors, and reclaimers of HFCs and other halocarbon alternatives for use in the cooling sector to participate in an extended producer responsibility (EPR) program. The proposed regulations will require that EPR programs accept refrigerants that contain HFCs and other halocarbon alternatives from certain stationary and mobile refrigeration and air-conditioning equipment.

**Sources:**

- Environment Canada. 2013. Acts and Regulations. Proposed Extended Producer Responsibility Regulations for Managing End-of-Life Ozone-Depleting Substances (ODS) and their Halocarbon Alternatives. Available at: <http://www.ec.gc.ca/lcpe-cepa/default.asp?lang=En&n=4DA3D0E9-1>. Accessed May 2013.

### China

HFC-23 Reduction Credits in Domestic Carbon Market. The Chinese Domestic Voluntary Carbon Market (DVCM) is currently under development and may allow HFC-23 reduction credits.

**Sources:**

- Han, G., Olsson, M., Hallding, K., Lunsford, D. 2012. China's Carbon Emission Trading. An Overview of Current Development. Available at: <http://www.sei-international.org/mediamanager/documents/Publications/china-cluster/SEI-FORES-2012-China-Carbon-Emissions.pdf>. Accessed May 2013.
- Point Carbon. 2013. Policy. China to allow HFC-23 offsets in domestic CO<sub>2</sub> markets. Available at: <http://www.pointcarbon.com/news/1.2214345>. Accessed May 2013.

### France

**HFC Tax.** The French Ministry for the Environment is considering introducing a tax on HFCs with a GWP greater than 150. Four different options are being considered for an HFC tax, with taxes ranging from 2.50€ to 60€ (USD 3.25 to USD 77.88, based on an exchange rate of 1.00€ = USD 1.30 from May 2013) per metric ton of CO<sub>2</sub>-eq., depending on the GWP. The Ministry for the Environment estimates that the French HFC tax could lead to reductions in HFCs of up to 50 percent by 2020 and 80 percent by 2030.

**Sources:**

- The French Environmental Taxation Committee. 2013. "Evaluation of HFC Tax." Available at: [http://www.developpement-durable.gouv.fr/IMG/pdf/Avis\\_liquides\\_frigorigenes.pdf](http://www.developpement-durable.gouv.fr/IMG/pdf/Avis_liquides_frigorigenes.pdf). Accessed September 2013.

### Mauritius and the Federated States of Micronesia

**Proposals to Amend the Montreal Protocol.** Mauritius and the Federated States of Micronesia have submitted proposals to amend the Montreal Protocol to regulate and phase-down HFCs:

*"For Small Island developing states and least developed countries, near-term, abrupt climate change threatens our way of life and, in some cases, our very existence. In the face of this existential threat, the Federated States of Micronesia and Mauritius implore the international community to utilize every available means of reducing greenhouse gas emissions and other climate forcing agents as quickly as possible while progress under the UNFCCC continues to be made to address the long-term drivers of climate change..."*

The Proposal specifically asks for a phase-down that reduces HFCs by between 5.3 to 19.7 Gt CO<sub>2</sub>-eq. by 2030 (between 1.3 to 3.3 Gt CO<sub>2</sub>-eq. per year by 2030) and between 52.2 to 171.6 Gt CO<sub>2</sub>-eq. by 2050 (3.3 to 12.9 Gt CO<sub>2</sub>-eq. per year by 2050).

**Sources:**

- UNEP. 2009. Open-ended Working Group of the Parties to the Montreal Protocol on Substances that Deplete the Ozone Layer. Twenty-ninth meeting. Available at: [http://ozone.unep.org/Meeting\\_Documents/oewg/29oewg/OEWG-29-8E.pdf](http://ozone.unep.org/Meeting_Documents/oewg/29oewg/OEWG-29-8E.pdf). Accessed May 2013.
- United Nations Environment Program. 2009. “Proposed Amendment to the Montreal Protocol”. Available at: [http://ozone.unep.org/Meeting\\_Documents/oewg/29oewg/OEWG-29-8E.pdf](http://ozone.unep.org/Meeting_Documents/oewg/29oewg/OEWG-29-8E.pdf). Accessed April 2013.

**Sweden**

**HFC Tax.** The Swedish Ministry of Finance published a proposal on introducing a tax on HFCs. The proposed tax is expected to decrease HFC emissions by approximately 0.1 million metric tons of CO<sub>2</sub>-eq. by 2020. In addition, a premium would be paid when HFCs are delivered for destruction.

**Sources:**

- Swedish Ministry of Finance. 2009. “Tax on Fluorinated Greenhouse Gases.” Available at: <http://www.regeringen.se/sb/d/108/a/128980> Accessed September 2013.

**United States**

**Section 608 Sales Restriction.** In the future, EPA may require that all standards included under Section 608 also apply to substitutes of Class I and Class II substances. Specifically, EPA may restrict the sale of HFC-134a so that only technicians certified under sections 608 and 609 may purchase it.

**Sources:**

- U.S. EPA. 2010. “Proposed Regulations for Recycling of Substitute Refrigerants under Section 608”. Available online at: <http://epa.gov/ozone/title6/608/subrecsm.html>. Accessed April 2013.

**United States (California)**

**Supermarket Refrigeration Systems.** The California Building Standards Commission has proposed additional measures on new supermarket refrigeration system design and installation leak-tight measures in the 2013 revisions to Title 24 (California Building Code), Part 11, “Green Building Standards.” The additional measures were formally proposed in October 2012, and currently are expected to be adopted without change by October 2013.

**MAC HFC Reductions.** CARB currently has three measures aimed at curbing HFC emissions in MACs or transportation refrigeration on hold. The three measures are as follows:

- Requirement to add an AC leak tightness test and repair to Smog Check program.
- Enforcement of existing federal requirements to recover refrigerant from MAC at end of life.
- Measure to reduce GHG emissions from refrigerated shipping containers.

**Sources:**

- U.S. EPA. 2010. Just the Facts for MVACs: EPA Regulatory Requirements for Servicing of Motor Vehicle Air Conditioners. Available online at: <http://www.epa.gov/ozone/title6/609/justfax.html>. Accessed April 2013.
- Gallagher, Glenn. 2013. Email communication between ICF International and Glenn Gallagher of CARB.
- CARB. Undated. “HFC Emission Reduction Measures for Mobile Air Conditioning”. Available online at: <http://www.arb.ca.gov/cc/hfc-mac/hfc-mac.htm>. Accessed April 2013.

## 5. Partnership Programs

### United States

The U.S. EPA manages two voluntary programs to reduce refrigerant and blowing agent emissions from refrigeration and air conditioning equipment. These two programs are able to reduce consumption and emissions of both ODSs and HFCs because this equipment has historically relied on a range of refrigerant and blowing agent types.

The **GreenChill Partnership** was established in 2007 to promote the retail food sector's transition to alternative refrigerants; the reduction in refrigerant charge sizes and leak rates; and the adoption of advanced refrigeration technologies, strategies, and practices. These goals are achieved through three initiatives under the partnership: the Corporate Emissions Reduction Program, which sets annual reduction goals for participants' corporate-wide refrigerant emissions and monitors their progress; the Store Certification Program, which awards multi-level certification to retail food stores for using environmentally-friendlier commercial refrigeration systems; and the Advanced Refrigeration Program, which promotes the use of green refrigeration technologies and environmental best practices.

EPA's **Responsible Appliance Disposal (RAD) Program** was established in 2006 to promote the proper disposal of refrigerators, freezers, window air conditioners, and dehumidifiers. RAD partners include utilities, retailers, and manufacturers, who use best practices to ensure that: refrigerant is recovered and reclaimed or destroyed; foam is recovered and destroyed, or the blowing agent is recovered and reclaimed; metals, plastic, and glass are recycled; and PCBs, mercury, and used oil are recovered and properly disposed. The RAD Program also includes state governments, who join as "state affiliates" to promote the program to potential partners within their state through information dissemination and strategic outreach. They may also serve as technical resources and provide recognition to partners within their states.

#### Sources:

- U.S. EPA. 2013. GreenChill Partnership. Available at: <http://www2.epa.gov/greenchill>. Accessed May 2013.
- U.S. EPA. 2013. Responsible Appliance Disposal (RAD) Program. Available at: <http://www2.epa.gov/rad>. Accessed May 2013.

## 6. Corporate Responsibility Initiatives

The following examples illustrate the corporate level initiatives to reduce HFC consumption and emissions; this list provides a cross-section of notable examples but should not be considered comprehensive.

### Non-HFC Refrigerants and the Olympic Games

For the 2012 Olympic Games in London, the International Olympic Committee, partnered with UNEP, ensured that 90 percent of cooling systems in the Olympic Park used non-HFC refrigerants. This initiative was part of the *Sustainability Through Sport* initiatives for implementing Agenda 21, the environmental commitment endorsed by the Olympic Movement in 1992. This initiative required sponsors such as McDonalds and Coca-Cola to implement non-HFC refrigerants in their operations.

#### Sources:

- International Olympic Committee. 2013. "Sustainability Through Sport- Implementing the Olympic Movements Agenda 21." Available at: <http://www.uncsd2012.org/content/documents/493OM%20Sustainability%20Through%20Sport%5B1%5D.pdf>. Accessed May 2013.

### **FK-5-1-12 for Rig Fleet’s Extinguisher System**

GlobalSantaFe, a drilling company which contracts a fleet of 59 mobile offshore rigs to oil and gas companies worldwide, considered several potential replacements for its halon fire extinguisher systems installed in engine rooms, silicon controlled rectifier (SCR) rooms, emergency generator rooms, control rooms and paint lockers aboard offshore rigs. The drilling company considered a wide range of alternative agents, including high-expansion foam, CO<sub>2</sub>, water mist, HFCs, inert gas blends, and FK-5-1-12. Each option was evaluated based on safety, environmental impact, effectiveness, and regulatory compliance. The company determined that FK-5-1-12 was the best replacement for its halon systems based on its high margin of safety and low environmental impact. The company ruled out HFCs due to their high GWPs and atmospheric lifetimes. In addition, they were pleased with the non-conductive properties of FK-5-1-12 that allow the systems to protect electronic equipment. Further, the agent can be shipped in bulk, leaves not residue, and meets all regulatory standards for paint lockers.

#### **Sources:**

- Ziemba, J. 2007. *Environment a priority in rig fleet’s fire safety selection*. World Oil. December 2007 issue, pgs 57-58. Available at: <http://www.worldoil.com/December-2007-Environment-a-priority-in-rig-fleets-fire-safety-selection.html>. Accessed May 2013.

### **FK-5-1-12 for Fire Protection**

One of the largest energy companies in the world, BP, has selected FK-5-1-12 for use in its new commodities trading building in Houston, Texas. The company considered many options for this new building, including HFCs and CO<sub>2</sub>, but concluded that FK-5-1-12 best suited their needs to protect electronic equipment and to minimize the amount of clean up after discharge. BP required a fire protection system that is effective, clean, efficient, and safe yet would have minimal environmental impact. FK-5-1-12 was selected over HFCs due to their high GWP and atmospheric persistence, and consideration of potential future HFC regulations; it was selected over CO<sub>2</sub> due to toxicity concerns; and it was selected over inert gas due to the amount of space the cylinders would have required. BP has been satisfied with the FK-5-1-12 system and has since adopted this alternative in other applications, such as the protection of utility modules in the Alaska North Slope oil field, as well as the protection of cables in drilling installations in the Caspian Sea.

#### **Sources:**

- 3M Company. 2009. “Case Study: BP Chooses Novec 1230 Fluid for Fire Protection.” 3M Novec 1230 Fire Protection Fluid. Available at: <http://www.sevosystems.com/Sell%20Sheets%20PDFS/Novec/BP%20uses%20Novec%201230.pdf>. Accessed May 2013.

### **HC Split System and Reversible CO<sub>2</sub> Heat Exchanger System in McDonald’s Restaurants – Philippines and Denmark**

McDonald’s, the world’s leading food service retailer, carried out a pilot project to convert a 35 kW split AC system with a roof mounted condensing unit and ceiling void, ducted evaporators with propane in one of their restaurants in the Philippines. The system outlets were fitted with leak detectors and the system was modified to remove any leaked refrigerant from the area. The unit showed 17.4% energy savings from direct power reduction. The success of this project has prompted McDonald’s Philippines to move implement climate-friendly alternatives wherever practical, safe, and viable to do so.

McDonald’s also undertook a pilot project in one of its restaurants in Denmark to replace all of its HFC refrigerants within the restaurant’s refrigeration and air conditioning equipment with a lower-GWP alternative. The air conditioning and heating system, which previously used R-407C, was replaced with a single reversible CO<sub>2</sub> heat exchanger system that could switch from heating to cooling based on temperature demand. A risk assessment study was performed and CO<sub>2</sub> monitors were installed for additional safety. The test restaurant consumed 12 percent less electricity using climate-friendly refrigerants and emissions over the lifetime of the restaurant were projected to be

27 percent lower compared to a conventional restaurant. McDonald's intends to use the findings of this pilot project as a stepping stone to help optimize equipment using climate-friendly refrigerants, particularly the HVAC system, and introduce equipment into restaurants as they become viable.

**Sources:**

- Energy Resources Group (ERG). Undated. "Case Study: McDonald's Fast Food Outlets – Philippines." Available at: <http://www.unep.fr/ozonaction/information/mmcfiles/6291-e-McDonaldsPhilippines.pdf>. Accessed May 2013.
- McDonald's. 2004. "The world's first HFC-free McDonald's restaurant. A pilot project in Vejle, Denmark." Available at: <http://www.unep.fr/ozonaction/information/mmcfiles/4256-e-mcdonalds.pdf>. Accessed May 2013.

### **Low-GWP Blowing Agents in XPS Manufacturing in Japan**

In 1998, the Japanese Extruded Polystyrene Foam Industry Association partially adopted a voluntary target to reduce use of HFC-134a in the manufacture of XPS foams by 11.8 percent in 2010, but in 2004 instead projected zero HFC use for 2010 and beyond. A report by the Ministry of Economy, Trade and Industry of Japan reported that the Dow Chemical Company committed to the voluntary target and developed technologies to improve cell structure, thermal performance, and combustion performance of their products. These improvements have made it possible for the safe application of hydrocarbon blowing agents such as isobutane. Dow Chemical reported a reduction in production of HFCs equivalent to 10 million metric tons CO<sub>2</sub>eq. per year compared to 1990; in 2006, only 5 tons of HFC-134a were used in XPS foam manufacture in Japan.

**Sources:**

- Ministry of Economy, Trade and Industry (METI). Japan's Technology to Reduce Fluorinated Gases 860 million CO<sub>2</sub> tons Reduction. Available at: [http://www.meti.go.jp/policy/chemical\\_management/ozone/files/pamplet/DVD/ozone\\_e.pdf](http://www.meti.go.jp/policy/chemical_management/ozone/files/pamplet/DVD/ozone_e.pdf). Accessed May 2013.

### **Low-GWP Blowing Agents in Japan's PU Spray Foam Sector**

The Japanese Urethane Manufacturers Association (JUMA) committed to a voluntary phaseout of HFC blowing agents in PU spray foam manufacturing through 2010. JUMA members focused on replacing HFC-134a, HFC-245fa, and HFC-365mfc with low-GWP alternatives such as HFE-254pc, CO<sub>2</sub>(water), cyclopentane, and supercritical carbon dioxide gas—all of which have been successfully implemented.

A report by the Ministry of Economy, Trade and Industry of Japan highlighted the successes of some individual enterprises in the transition away from HFCs. The Achilles Corporation developed flame-retardant non-fluorocarbon spray systems using supercritical CO<sub>2</sub> gas. The resulting spray foam had excellent low-temperature adhesion, allowing it to be used in colder temperatures, similar to HFC blown foams. The Achilles Corporation estimated an emission reduction of approximately 50,000 metric tons CO<sub>2</sub> in 2007 as a result of the transition, and had set a target of 350,000 metric tons CO<sub>2</sub> for 2010.

The Bridgestone Corporation developed a spray-in-place urethane using carbon dioxide generated from water rather than fluorocarbon blowing agents. This did not require a change from conventional equipment and resulted in a 61 percent reduction in GHG emissions over the product lifecycle.

**Sources:**

- Ministry of Economy, Trade and Industry (METI). Japan's Technology to Reduce Fluorinated Gases 860 million CO<sub>2</sub> tons Reduction. Available at: [http://www.meti.go.jp/policy/chemical\\_management/ozone/files/pamplet/DVD/ozone\\_e.pdf](http://www.meti.go.jp/policy/chemical_management/ozone/files/pamplet/DVD/ozone_e.pdf). Accessed May 2013.

## Nestlé's Global Transition to Ammonia/ CO<sub>2</sub> Technologies in Industrial Refrigeration Applications

Since 1997, Nestlé—a large global food company—has taken a leading role in the adoption of industrial refrigeration systems that use ammonia and CO<sub>2</sub> together in a cascade design (Nestlé 2001). With support from Axima Refrigeration, in 1997 Nestlé installed its first ammonia/ CO<sub>2</sub> plant in France. In 2000, the company then converted its Hayes freeze drying factory in the UK from HCFC-22 to ammonia/ CO<sub>2</sub> (Nestlé 2004). The success of these projects led to the transition to more than 50 ammonia/ CO<sub>2</sub> cascade systems worldwide, including plants in the US, Russia, and Thailand (Axima Refrigeration 2012; Nestle 2004).

### Sources:

- Axima Refrigeration. 2012. "Ammonia/CO<sub>2</sub> refrigeration systems –case study." Presentation given by Jean-Claude Logel at the *Conference on Advancing Ozone and Climate Protection Technologies: Next Steps* in Bangkok, Thailand, July 21-22, 2012.
- Nestlé. 2004. "Moving Towards Sustainable Refrigeration Industrial Applications." Available at: [http://www.nestle.com/Common/NestleDocuments/Documents/Reports/CSV%20reports/Environmental%20sustainability/Refrigeration\\_industrial\\_applications.pdf](http://www.nestle.com/Common/NestleDocuments/Documents/Reports/CSV%20reports/Environmental%20sustainability/Refrigeration_industrial_applications.pdf). Accessed May 2013.
- Nestlé. 2001. "The Nestlé Position on Industrial Refrigeration." Available at: [http://www.nestle.com/Common/NestleDocuments/Documents/Library/Documents/Environmental\\_Sustainability/Position-Industrial-Refrigeration-Oct2001.pdf](http://www.nestle.com/Common/NestleDocuments/Documents/Library/Documents/Environmental_Sustainability/Position-Industrial-Refrigeration-Oct2001.pdf). Accessed May 2013.

## Unilever's Transition to Hydrocarbon Ice Cream Freezers

In 2000, Unilever—an international ice cream company that owns about two million ice cream freezers throughout the world—pledged that it would not buy ice cream freezers that were charged with HFC refrigerants after 2005 in countries where legal and commercially viable alternatives were available (Unilever 2008; AIRAH 2007). After deciding that hydrocarbons were the most viable option, the company had 50 propane ice cream freezers manufactured for the 2000 Sydney Olympics. Testing of this equipment confirmed that the propane cabinets would be able to maintain the correct temperatures even under severe use conditions (Unilever 2008). It was also found that the cases used considerably less energy than the comparable R-404a freezers. By mid-2008, there were 270,000 such units in use worldwide (Gerwen et al. 2008); and by January 2012, Unilever had placed over 900,000 HC ice-cream coolers around the world, including South Africa, China, Europe, Brazil, and the United States (Greenpeace 2012). In the United States, Unilever pioneered the testing of these coolers in its Ben & Jerry's ice cream stores, testing up to 2,000 units (Greenpeace 2012). This activity significantly contributed to the approval of HC self-contained commercial refrigeration units by EPA's SNAP Program in 2011.

### Sources:

- Australian Institute of Refrigeration, Air Conditioning, and Heating (AIRAH). 2007. "Natural Refrigerant Case Studies." Available at: <http://www.environment.gov.au/atmosphere/ozone/publications/pubs/refrigerants-guide.pdf>. Accessed May 2013.
- Gerwen, Rene Van, Alan Gerrard, and Fabio Roberti. 2008. "Ice Cream Cabinets Using Hydrocarbon Refrigerant: From Technology concept to Global Rollout." Prepared for the 8th IIR Gustav Lorentzen Conference on Natural Working Fluids. Available at: [http://www.unilever.com/images/Ice%20Cream%20Cabinets%20Using%20a%20Hydrocarbon%20Refrigerant%20-%20From%20Technology%20Concept%20to%20Global%20Rollout\\_tcm13-262015.pdf](http://www.unilever.com/images/Ice%20Cream%20Cabinets%20Using%20a%20Hydrocarbon%20Refrigerant%20-%20From%20Technology%20Concept%20to%20Global%20Rollout_tcm13-262015.pdf). Accessed May 2013.
- Greenpeace. 2012. "Cool Technologies: Working without HFCs – Examples of HFC-Free Cooling Technologies in Various Industrial Sectors." Prepared by Janos Mate, Greenpeace International. Interim 2012 Report.

- Unilever Foods. 2008. “Unilever Ice Cream Cabinets: Conversion to Natural Refrigerants.” Technical case study.

### **Yantai Moon’s Conversion to Ammonia/CO<sub>2</sub> Technologies for Cold Storage and Freezing Applications in China**

In 2011, Yantai Moon became the first enterprise in China to carry out a demonstration project for conversion from HCFC-22 to ammonia/ CO<sub>2</sub> rather than HFCs in the manufacturer of a two-stage refrigeration system for cold storage and freezing applications. The project was undertaken with support from UNDP and the Ministry of Environmental Protection of the P.R.C. Since the launch of the project, the company has successfully redesigned their product, modified their production lines, established a test device for product performance, and manufactured prototype products. The company is now engaged in personnel training and technology dissemination. Testing of the product has shown that the electricity consumed by the ammonia/ CO<sub>2</sub> cascade refrigeration system is 11 percent lower than a comparable ammonia system, although investment costs are slightly higher (Yantai Moon 2012).

#### **Sources:**

- Yanti Moon. 2012. “Ammonia/CO<sub>2</sub> freezing systems.” Presentation given by Jiang Shaoming at the Conference on *Advancing Ozone and Climate Protection Technologies: Next Steps* in Bangkok, Thailand, July 21-22, 2012.

### **Consumer Goods Forum (CGF) Board Resolution on Sustainable Refrigeration**

In response to the need to reduce emissions of harmful greenhouse gases, in 2010 the Consumer Goods Forum (CGF)—a global industry network consisting of retailers, manufacturers, service providers, and other stakeholders—agreed to “begin phasing-out hydrofluorocarbon (HFC) refrigerants as of 2015 and replace them with non-HFC refrigerants (lower GWP alternatives) where these are legally allowed and available for new purchases of point-of-sale units and large refrigeration installations.” Following the resolution and action plan established in 2010, a second Refrigeration Summit was held in 2011 to discuss and address challenges to meeting their objective. The third Refrigeration Summit is slated to take place on June 5, 2013 and will focus on addressing the challenges identified in the second Refrigeration Summit, including:

- Public policy and regulatory barriers (e.g., SNAP approvals, ASHRAE 15, UL 1995, proposed Montreal Protocol amendments and post-Kyoto agreements);
- Collecting and synthesizing information on HFC-free technologies to show retailers that it is a viable technology; and
- Building scale and giving suppliers and retailers the confidence to make the transition away from HFCs.

The CGF Board Members and the CGF Sustainability Steering Group Members compiled a “living” document that captures the commitments and good practices of its members. The document is updated twice a year and is available on the CGF website. The following link directs to the most recent version:

<http://sustainability.mycgforum.com/images/TCGF%20Refrigeration%20Good%20Practices%20Oct%202012%20FINAL.pdf>

#### **Sources:**

- Consumer Goods Forum (CGF). 2010. TCGF Board Resolution on Sustainable Refrigeration. Available at: [http://sustainability.mycgforum.com/images/sustainability-pic/Board\\_Resolutions\\_on\\_Deforestation\\_and\\_Refrigeration.pdf](http://sustainability.mycgforum.com/images/sustainability-pic/Board_Resolutions_on_Deforestation_and_Refrigeration.pdf). Accessed May 2013.
- Consumer Goods forum (CGF). 2013. Sustainability: Driving sustainability improvement throughout the value chain. Available at: <http://sustainability.mycgforum.com/refrigeration.html> . Accessed May 2013.

## GreenFreeze Hydrocarbon Domestic Refrigeration

GreenFreeze Technology, which refers to refrigerators and freezers that use cyclopentane and isobutene (R-600a) rather than HFCs, was developed by Greenpeace in 1992. There are 650 million hydrocarbon refrigerators in the world today, with approximately 35 to 40 million entering the market each year. All of the major European, Japanese, and Chinese manufacturers now produce GreenFreeze refrigerators. Hydrocarbon refrigerators entered the Mexican market in 2009 and the American market in 2012. Companies offering non-HFC options include Bosch, Continental, Electrolux, General Electric, Haier, Panasonic, LG Electronics, Samsung, Toshiba, and Whirlpool.

### Source:

- Mate, J., C. Papathanasopoulos, and S. Latif. 2012. "Cool Technologies: Working without HFCs. 2012 Edition." Greenpeace. Available at: <http://www.greenpeace.org/international/Global/international/publications/climate/2012/Fgas/es/Cool-Technologies-2012.pdf>. Accessed May 2013.

## Coca-Cola's Goal of 100 Percent HFC-Free Vending Machines and Coolers

Since 2000, Coca-Cola has developed new, high-efficiency CO<sub>2</sub> technology for vending machines, coolers, and fountain dispensers. In December 2009, Coca-Cola announced that 100 percent of their new vending machines and coolers would be HFC-free by 2015; as of April 2012, 600,000 units have been installed world-wide. Coca-Cola bottling plants in Belgium, continental France, UK, Luxembourg, Monaco, the Netherlands, Norway, and Sweden started purchasing HFC-free coolers only starting in January 2013. Coca-Cola has reported that with 40°C ambient temperatures, suppliers achieved better efficiency with CO<sub>2</sub> than with HFC-134a.

### Source:

- Mate, J., C. Papathanasopoulos, and S. Latif. 2012. "Cool Technologies: Working without HFCs. 2012 Edition." Greenpeace. Available at: <http://www.greenpeace.org/international/Global/international/publications/climate/2012/Fgas/es/Cool-Technologies-2012.pdf>. Accessed May 2013.

## PepsiCo's HFC-Free Coolers

As of April 2012, Pepsi had installed nearly 150,000 HFC-free coolers and vending machines world-wide. These units are primarily hydrocarbon-based. Cooling equipment in Pepsi's Turkish operations have been HFC-free since 2009.

### Source:

- Mate, J., C. Papathanasopoulos, and S. Latif. 2012. "Cool Technologies: Working without HFCs. 2012 Edition." Greenpeace. Available at: <http://www.greenpeace.org/international/Global/international/publications/climate/2012/Fgas/es/Cool-Technologies-2012.pdf>. Accessed May 2013.

## Heineken's Reduced Carbon Footprint

Heineken, in attempts to reduce the carbon footprint of their installed fridge base by 50 percent by 2020, began installing hydrocarbon refrigerant bottle coolers on a global scale. In 2010, Heineken sourced approximately 130,000 hydrocarbon coolers. In addition to replacing HFC as a refrigerant, Heineken is also switching to LED lighting and energy management thermostats in their equipment. In combination, these efforts are expected to save the company 30 percent in energy expenditure.

### Source:

- Mate, J., C. Papathanasopoulos, and S. Latif. 2012. "Cool Technologies: Working without HFCs. 2012 Edition." Greenpeace. Available at: <http://www.greenpeace.org/international/Global/international/publications/climate/2012/Fgas/es/Cool-Technologies-2012.pdf>. Accessed May 2013.

### **Red Bull's ECO-Coolers**

Red Bull has begun to replace their HFC coolers with ECO-Coolers, which use a combination of hydrocarbons and have improved fan systems. ECO-Coolers consume up to 45 percent less energy than previous generations of cooling equipment. Due to favorable CO<sub>2</sub> emissions data, Red Bull now orders Eco-Coolers whenever legally and technically feasible. As of 2012, 313,000 ECO-Coolers were installed worldwide, the equivalent of 35 percent of Red Bull's entire cooling fleet.

**Source:**

- Mate, J., C. Papathanasopoulos, and S. Latif. 2012. "Cool Technologies: Working without HFCs. 2012 Edition." Greenpeace. Available at: <http://www.greenpeace.org/international/Global/international/publications/climate/2012/Fgas/es/Cool-Technologies-2012.pdf>. Accessed May 2013.

## 7. Multilateral Environmental Agreements (MEAs)

**Several multilateral environmental agreements (MEAs) are taking measures that address HFCs, as highlighted below.**

### **Kiruna Declaration, Arctic Council**

Members of The Arctic Council gathered on the May 15, 2013 to urge the Parties to the Montreal Protocol to take action as soon as possible, complementary to the UNFCCC, to phase-down the production and consumption of HFCs. The signatories of this declaration include Canada, Sweden, Denmark, Iceland, Finland, Russia, Norway, and The United States.

#### **Sources:**

- U.S. Department of State. 2013. “Kiruna Declaration: On the Occasion of the Eighth Ministerial Meeting of the Arctic Council.” Available at: <http://www.state.gov/r/pa/prs/ps/2013/05/209405.htm>. Accessed May 2013.

### **UNFCCC and the Kyoto Protocol**

The UNFCCC and its Kyoto Protocol commits its Parties by setting internationally binding emission reduction targets of HFCs (as well as other five other greenhouse gases i.e., CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O, PFCs, and SF<sub>6</sub>). Its first commitment period started in 2008 and ended in 2012. Prior to the end of the first commitment period, Parties met in Durban (COP17/CMP7) and established the Ad Hoc Working Group on the Durban Platform for Enhanced Action (ADP). The ADP was tasked with developing a protocol, legal instrument, or some other type of outcome with legal force under the Convention, applicable to all Parties. The ADP is to complete its work as early as possible, but no later than 2015, so that it can come into effect and be implemented from 2020. At COP18/CMP8 in Doha (December 2012), an amendment was adopted and Annex I Parties agreed to a second commitment period from 1 January 2013 to 31 December 2020. Although the outcomes of Durban and Doha show progress towards establishing a successor agreement, the details have yet unfold.

#### **Sources:**

- United Nations (UN). 2013. United Nations Framework Convention on Climate Change: Kyoto Protocol. Available online at: [http://unfccc.int/kyoto\\_protocol/items/2830.php](http://unfccc.int/kyoto_protocol/items/2830.php). Accessed April 2013.
- United Nations (UN). 2013. Durban conference delivers breakthrough in international community’s response to climate change. Available at: <http://www.un.org/wcm/content/site/climatechange/pages/gateway/the-negotiations/durban>. Accessed April 2013.
- United Nations (UN). 2012. Doha climate conference.

### **Rio +20**

The United Nations Conference on Sustainable Development, known as Rio+20, was held in Rio de Janeiro from June 20-22 2012.

- **The Future We Want.** More than a hundred heads of state signed the Rio +20 declaration, *The Future We Want*, supporting a gradual HFC phase-down:

*“We recognize that the phase-out of ozone depleting substances (ODS) is resulting in a rapid increase in the use and release of high global warming potential hydrofluorocarbons (HFCs) to the environment. We support a gradual phase-down in the consumption and production of HFCs.”*

#### **Sources:**

- United Nations (UN). 2011. About the Rio+20 Conference. Available at: <http://www.uncsd2012.org/about.html> . Accessed April 2013.
- United Nations (UN). 2012. Future We Want – Outcome document. Available online at: <http://sustainabledevelopment.un.org/futurewewant.html>. Accessed April 2013.

Executive Committee of the Multilateral Fund for the Implementation of the Montreal Protocol (MLF)

In 2010, the MLF agreed to incentivize developing countries to opt for low-GWP alternatives (e.g. hydrocarbons) instead of high-GWP HFCs when phasing out HCFCs. As set forth in the guidelines of ExCom Decision 60/44:

*“Funding of up to a maximum of 25 per cent above the cost effectiveness threshold will be provided for projects when needed for the introduction of low global warming potential (GWP) alternatives.”*

**Source:**

- United Nations Environment Programme (UNEP). 2010. Executive Committee of the Multilateral Fund for the Implementation of the Montreal Protocol. Sixtieth Meeting: Draft Decision on Agenda Item 9(b). Available online at: <http://www.multilateralfund.org/sites/60/pages/English%20Documents.aspx>. Accessed April 2013.

**Proposals to amend the Montreal Protocol**

- 2013 North American Proposal to Address HFCs under the Montreal Protocol: [http://www.epa.gov/ozone/downloads/HFC\\_Amendment\\_2013-Text.pdf](http://www.epa.gov/ozone/downloads/HFC_Amendment_2013-Text.pdf)
- Proposed amendment to the Montreal Protocol submitted by the Federated States of Micronesia: <http://conf.montreal-protocol.org/meeting/oweg/oweg-33/preession/PreSession%20Documents/OEWG-33-4E.pdf>

**Decision XXII/Anx III: Annex III - Declaration on the global transition away from hydrochlorofluorocarbons (HCFCs) and chlorofluorocarbons (CFCs)**

Recognizing that HFCs are replacements for ozone-depleting substances being phased out under the Montreal Protocol, and that the projected increase in their use is a major challenge for the world’s climate system that must be addressed through concerted international action, more than 90 countries declared their intent to pursue further action under the Montreal Protocol aimed at transitioning the world to environmentally sound alternatives to HCFCs and CFCs.

**Source:**

- United Nations Environment Programme (UNEP). 2011. Available at: [http://ozone.unep.org/new\\_site/en/Treaties/decisions\\_text.php?dec\\_id=1070](http://ozone.unep.org/new_site/en/Treaties/decisions_text.php?dec_id=1070). Accessed May 2013.

**Bali Declaration**

Indonesia, the MOP23 host country, put forward the “Bali Declaration on Transitioning to Low Global Warming Potential Alternatives to Ozone Depleting Substances.” The initiative calls on Parties “to explore further and pursue under the Montreal Protocol the most effective means of achieving the transition to low global warming potential alternatives.”

**Source:**

- ATMOSphere. 2011. “Montreal Protocol Parties Request More Info on Low-GWP Alternatives.” Available at: <http://www.atmo.org/news.details.php?id=161>. Accessed May 2013.

**International Maritime Organization (IMO)**

As a result of the MARPOL Conference (September 1997), the IMO was tasked with undertaking a study to estimate the relative percentage of GHG emissions from ships as part of the global inventory of GHG emissions. The *IMO Study of Greenhouse Gas Emissions from Ships* was completed and presented to MEPC45 (the forty-fifth session of the Marine Environment Protection Committee, or MEPC) in June 2000, as document MEPC 45/8. As agreed upon at MEPC 55 (October 2006), an international consortium set out to prepare an updated version of the report, *Second IMO GHG Study 2009*. The study addressed HFCs and other greenhouse gases (CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O, PFCs, and SF<sub>6</sub>) and other relevant substances, including NO<sub>x</sub>, NMVOC, CO, PM, and SO<sub>x</sub>. The study notes that the replacement of CFCs and HCFCs has resulted in increased use and emissions of HFCs. Further, the study presents two options for reducing emissions of HFC refrigerants used aboard ships: (1) taking technical measures to prevent and reduce leaks; and (2) allowing safe and “not unreasonably burdensome” recovery of refrigerants during maintenance. In July 2011, IMO’s MEPC adopted the

first ever mandatory global GHG reduction measures for an entire industry sector—shipping. The new regulations apply to energy efficiency for ships and at this time do not cover HFCs in their scope.

**Sources:**

- International Maritime Organization (IMO). 2009. Second IMO GHG Study 2009. Available online at: [http://www.imo.org/blast/blastDataHelper.asp?data\\_id=27795&filename=GHGStudyFINAL.pdf](http://www.imo.org/blast/blastDataHelper.asp?data_id=27795&filename=GHGStudyFINAL.pdf). Accessed April 2013.
- International Maritime Organization (IMO). 2013. Technical and Operational Measures. Available online at: <http://www.imo.org/ourwork/environment/pollutionprevention/airpollution/pages/technical-and-operational-measures.aspx>. Accessed April 2013.
- The London 2012 Use of HFCs Policy is available at: <http://learninglegacy.independent.gov.uk/documents/pdfs/sustainability/cp-london-2012-use-of-hfcs-policy.pdf>.

### **Olympic Movement’s Agenda 21**

The International Olympic Committee (IOC) adopted Agenda 21 at its Session in June 1999 in Seoul and subsequently endorsed by the entire Olympic Movement at the Third World Conference on Sport and the Environment in Rio de Janeiro in October 1999. The “Rio Statement” made by this conference charts the course of action for the implementation of Agenda 21. A joint UNEP/IOC Working Group has since been established to monitor its implementation. The Olympic movement’s Agenda 21 has been an impetus for developing comprehensive sustainability plans in subsequent Games. The London Organizing Committee of the Olympic and Paralympic Games (LOCOG) published a guide on the use of HFCs in new facilities or equipment procured for use in venues.

**Source:**

- Learning Legacy. 2012. The London 2012 Use of HFCs Policy. Available at: <http://learninglegacy.independent.gov.uk/documents/pdfs/sustainability/cp-london-2012-use-of-hfcs-policy.pdf>. Accessed April 2013.

## 8. Executive Committee of the Multilateral Fund for the Implementation of the Montreal Protocol (MLF)

In accordance with Decision XIX/6 (September 2007), the Parties agreed to accelerate the phaseout of production and consumption of hydrochlorofluorocarbons (HCFCs) by way of an adjustment. In that context, the Parties agreed to direct the Executive Committee (ExCom) to encourage Parties to:

(a) 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; and

(b) give priority to, among other things, cost-effective projects and programs that focus on substitutes and alternatives that minimize other impacts on the environment, including on the climate, taking into account global-warming potential, energy use, and other relevant factors.

In 2010, the MLF agreed to guidelines to help implement the Parties decision. Specifically, they agreed to incentivize developing countries to opt for low-GWP alternatives (e.g., hydrocarbons) instead of high-GWP HFCs when phasing out HCFCs. As set forth in the guidelines of ExCom Decision 60/44:

*“Funding of up to a maximum of 25 per cent above the cost effectiveness threshold will be provided for projects when needed for the introduction of low global warming potential (GWP) alternatives.”*

Three years later, we can see the incredible efforts that dozens of Article 5 parties have displayed in phasing out HCFCs (particularly in the foams sector) without the use of high-GWP HFCs. As illustrated in, of the 43 countries with rigid PU foams producers, 41 have opted to phase out their use of HCFCs through conversion to low-GWP, non-HFC alternatives.

Table 4. Efforts to Phaseout HCFCs in Article 5 Countries

Country <sup>a</sup>	HCFC-141b	Replacement technology	Approved (USD)	Cost (USD)		CE <sup>b</sup> (USD/kg)
	(ODP t)			Capital	Operating	
Algeria (1)	2.40	Cyclopentane	215,380	216,045	(665)	9.87
Argentina (1)	18.46	Cyclopentane	838,612	837,210	1,402	5.00
Bangladesh (1)	20.20	Cyclopentane	1,146,074	1,025,750	120,324	6.24
Bosnia and Herzegovina (1)	4.78	Cyclopentane	425,361	363,149	62,212	9.79
Brazil	32.50	Cyclopentane	2,136,135	2,307,610	(171,475)	7.23
Cameroon (9)	15.70	Methyl formate	310,900	310,900		2.18
China (3 demonstration) <sup>c</sup>	13.60	Cyclopentane HFC-245fa	2,195,412			17.75
China (unknown) <sup>d</sup>	1,615.00	Cyclopentane	73,000,000			4.97
Colombia (4) <sup>e</sup>	46.21	Cyclopentane	5,621,483	5,058,456	563,027	9.39
Costa Rica (1)	14.00	Cyclopentane	593,523	593,523		4.66
Croatia (1)	1.76	Water/CO <sub>2</sub>	210,000	210,000		13.13
Cuba (5)	13.35	Cyclopentane	1,187,527	1,187,527		9.78
Dominican Republic (1)	3.70	Cyclopentane	332,775	316,775	16,000	9.89
Dominican Republic (13)	15.77	Methyl formate	663,450	480,700	182,750	4.63
Ecuador (1)	14.96	Cyclopentane	1,331,440	1,198,440	133,000	9.79
Egypt (8)	77.54	Cyclopentane/ methyl formate	3,359,155	3,617,900	(258,745)	4.77
El Salvador (3)	4.94	Cyclopentane/ methyl formate	439,277	424,427	14,850	9.78
Guatemala (1)	1.40	Cyclopentane	109,637	109,637		8.61
India (16)	310.53	Cyclopentane	13,981,990	12,631,330	1,350,660	4.95
Indonesia (26)	33.51	HFC-245fa	2,714,187	2,706,587	7,600	8.91
Indonesia (4)	10.40	Cyclopentane	777,395	708,638	(2,108)	8.26
Islamic Republic of Iran (23)	62.56	Cyclopentane	4,782,642	5,325,750	(543,109)	8.41
Jamaica (1)	3.60	Methyl formate	95,450	57,200	38,250	2.92
Kuwait (2 + SMEs)	36.55	Cyclopentane	738,382			2.22
Lebanon (1)	15.10	Cyclopentane	1,342,209			9.78
Malaysia (13)	94.60	Cyclopentane	7,327,470	6,816,745	510,725	8.52
Mexico (1) <sup>f</sup>	38.94	Cyclopentane	2,428,987	2,293,104	135,883	3.68
Mexico (3)	22.99	Cyclopentane	2,046,110	1,711,710	334,400	9.79
Morocco (1)	11.00	Cyclopentane	951,740	990,000	(38,260)	9.52
Oman (1)	1.20	Water/CO <sub>2</sub>	79,120	79,120		7.25
Pakistan (5)	71.60	Cyclopentane	4,840,849	4,844,400	(3,552)	7.44
Philippines (13 + 47 SMEs)	43.00	Cyclopentane/CO <sub>2</sub>	2,088,000			5.34
Saudi Arabia (18)	125.10	Pentane	6,882,370	7,642,050	(759,680)	6.05
South Africa (2)	38.90	Cyclopentane	2,498,848	2,498,848		7.07
Sri Lanka (1)	0.45	Cyclopentane	18,860	18,860		4.61
Sudan (4)	11.90	Cyclopentane	1,056,341	1,056,341	(569)	9.76
Swaziland (1)	7.70	Cyclopentane	667,948	667,948		4.77
Thailand (28)	73.96	Cyclopentane	6,111,060			9.09
Thailand (103)	91.40	HFC-245fa	5,383,202			6.48
Trinidad and Tobago (5)	2.50	Methyl formate	173,800	151,900	21,900	7.65
Turkey (sector)	228.63	Cyclopentane	3,631,897	3,050,700	581,197	1.75
Viet Nam (12)	140.10	Cyclopentane	8,876,200	6,837,200	2,039,000	6.97
Zimbabwe (5)	6.10	Cyclopentane	478,818	547,650	(68,832)	8.63
<b>Total</b>	<b>3,398.59</b>		<b>174,090,016</b>	<b>78,894,130</b>	<b>4,266,185</b>	<b>5.63</b>

<sup>a</sup> Number in parenthesis represents the number of enterprises to be converted.

<sup>b</sup> Cost Effectiveness

<sup>c</sup> Approved as demonstration projects prior to adoption of decision 60/44, on the understanding that the HCFC consumption associated with the projects would be deducted from the consumption eligible for funding.

<sup>d</sup> The actual enterprises that would be converted during stage I of the HCFC Phaseout Management Plan (HPMP) for China were not known at the time of submission of the HPMP. Since the approval of the HPMP, several PU foam enterprises have already been selected for conversion. As reported in document UNEP/OzL.Pro/ExCom/68/24, as of July 2012, a total of 33 enterprises with a total consumption of 8,875.45 metric tons (976.30 ODP metric tons) of HCFC-141b) were selected and requested to submit project proposals to Foreign Economic Cooperation Office (FECO) for review. In addition, 30 production lines in 29 room air-conditioning manufacturing enterprises were audited. Of the total funding of USD 38,859,000 approved so far, USD 19,429,500 was to be disbursed by the World Bank to FECO by the end of November or early December 2012.

<sup>e</sup> An additional 9.82 ODP metric tons of HCFC-22 used as a foam blowing agent.

<sup>f</sup> An additional 16.83 ODP metric tons of HCFC-22 used as a foam blowing agent.

As shown in Table 5, six countries also included projects for adapting locally-owned systems houses for manufacturing non-HCFC 141b pre-blended polyol systems and, through them, converting large numbers of downstream foam enterprises.

**Table 5. Analysis of HCFC-141b Phaseout Through Systems Houses**

Country	HCFC-141b (ODP t)	Replacement technology	Approved (USD)	Cost (USD)		CE <sup>a</sup> (USD/kg)
				Capital	Operating	
Brazil	136.30	Cyclopentane/ methyl formate	13,033,703	12,339,983	10,726,093	10.52
Egypt	75.74	Methyl formate	3,800,600	2,974,400	826,200	5.52
Mexico	299.79	Methyl formate	11,225,030	7,750,563	3,474,467	4.12
Nigeria	79.50	Methyl formate/ CO <sub>2</sub>	855,603			1.18
Saudi Arabia <sup>b</sup>	215.90	Pentane	2,324,700	2,324,700	-	1.18
South Africa	95.20	Methyl formate	2,247,108	1,747,358	499,750	2.60
<b>Total</b>	<b>902.43</b>		<b>33,486,744</b>	<b>27,137,004</b>	<b>15,526,510</b>	<b>4.08</b>

<sup>a</sup> Cost Effectiveness

<sup>b</sup> Including 751.73 mt (82.69 ODP metric tons) of HCFC-141b to be phased out without assistance from the Fund. (\*\*)(\*) Including 465.45 mt (51.20 ODP metric tons) of HCFC-141b to be phased out without assistance from the Fund.

As shown in Table 6, the Fund Secretariat performed a simplified analysis to provide an estimate of the GWP benefits of the HCFC phaseout work done to date. Their calculation was based only on the effect caused by the eventual emission of refrigerants (i.e., a comparison of the GWP values of the HCFCs to be phased out and the alternative substances being introduced regardless of when emissions take place), and using the phaseout of annual consumption in manufacturing of, mostly, refrigeration and air-conditioning equipment and foam products, as an approximation of future emissions of refrigerants into the atmosphere. That calculation concluded that for each year of manufacturing, the substances used after conversion have, when released, an impact on the climate which is lower by 79.4 million metric tons of CO<sub>2</sub>-equivalent than the impact of the equivalent amount of HCFC.

**Table 6. Simplified Calculation of the Impact on the Climate from HCFCs and Their Replacements**

Application*	HCFC	Alternative technology**	HCFC		Emissions (metric tons CO <sub>2</sub> equivalent)		
			(ODP t)	(mt)	Current	Alternative	Avoided
PU foam	HCFC-141b***	L	4,176.1	37,964.6	27,068,786	531,505	(26,537,281)
		H	124.9	1,135.5	809,644	818,728	9,084
XPS foam	HCFC-142b	L	394.8	6,073.8	13,787,631	72,886	(13,714,745)
		H	120.0	1,846.2	4,190,769	137,354	(4,053,415)
XPS foam	HCFC-22	L	413.4	7,516.4	13,379,127	90,196	(13,288,931)
		H	75.2	1,367.3	2,433,745	101,725	(2,332,020)
Solvent ****	HCFC-141b	L	132.0	1,200.0	855,600	24,000	(831,600)
		H	-	-	-	-	-
RAC	HCFC-22	L	656.4	11,934.5	21,243,491	214,822	(21,028,669)
		H	719.2	13,076.4	23,275,927	25,656,627	2,380,700
Manufacturing	Subtotal		6,812.0	82,114.7	107,044,721	27,647,844	(79,396,877)
Servicing	HCFC-22		1,098.2	19,967	35,541,745		
	HCFC-142b		141.8	2,182	4,953,140		

This analysis helps to demonstrate the incredible strides that have been made in the foams sector, while highlighting the need for further work in the refrigeration and air conditioning sector.

#### Sources:

- United Nations Environment Programme (UNEP). 2011. United Nations Environment Programme Ozone Secretariat: Meetings of the Parties to the Montreal Protocol. Available online at: [http://ozone.unep.org/new\\_site/en/committee\\_documents.php](http://ozone.unep.org/new_site/en/committee_documents.php). Accessed June 2013.
- Information above was provided by Mr. Eduardo Ganem (eganem@unmfs.org), Deputy Chief Officer of the Fund Secretariat.

## 9. Research and Other Initiatives

This section provides a listing of some notable research on policies related to HFC consumption or emissions. Other country measures and smaller-scale initiatives to reduce, eliminate, or prevent HFC consumption are also listed.

### Research

World Resources Institute (WRI) report: *Can The U.S. Get There From Here? Using Existing Federal Laws and State Action to Reduce Greenhouse Gas Emissions.*

Given the forecasted increase in HFC emissions as they replace HCFCs, the World Resources Institute (WRI) recommends, as a finding within this report, that the United States pursue HFC reductions through amendments to the Montreal Protocol and the Clean Air Act Authority. HFCs represented two percent of all U.S. GHG emissions in 2010. The elimination of HFCs is the second to reductions of CO<sub>2</sub> emissions from power plants in terms of the largest opportunity for GHG emissions reductions in the United States. To contribute effectively to its international pledge of a 17 percent total reduction in global warming pollution below 2005 levels by 2020, the United States must phase down 23 percent of total HFC emissions. The most aggressive approach suggested by the Report is a 60 percent reduction of the projected emissions for 2020 (from 458 million metric tons CO<sub>2</sub>-eq. to 181 million metric tons CO<sub>2</sub>-eq.), which can be accomplished using the existing Montreal Protocol framework and authority under the Clean Air Act.

#### Source:

- World Resources Institute. 2013. "Can The U.S. Get There From Here? Using Existing Federal Laws and State Action to Reduce Greenhouse Gas Emissions." Available at: <http://www.wri.org/publication/can-us-get-there-from-here>. Accessed April 2013.

### Preparatory study for a review of Regulation (EC) No. 842/2006 on certain f-GHGs

This study was prepared for the European Commission in September 2011 as an assessment of the effectiveness of Regulation (EC) No. 842/2006 and the feasibility and cost-effectiveness of additional HFC and other F-gas emission reductions. In addition, the report reviewed relevant F-gas policies internationally and within the EU-27 to determine potential interactions, complementarities, or overlaps with the EU F-gas Regulation. Of the five measures Member States must take to implement the EU F-gas Regulation (i.e., training and certification, containment, recovery, reporting, labeling, and bans), the study found that bans have been the most effective measure and have resulted in significant and measurable reductions in the use (and therefore emissions) of F-gases. The actual impacts of the F-gas Regulation were determined by a comparison of two scenarios, a "without measures" (WOM) scenario and a "with measures" (WM) scenario, which includes the EU MAC Directive and F-gas Regulation. The emission reduction potential of the EU F-gas policy framework is estimated at 2.6 percent at present and is anticipated to increase to 22 percent reduction in 2015 and 46 percent reduction in 2050.

The study also examined the feasibility of implementing additional F-gas reduction measures in the EU across all sectors currently relying on F-gases. Although many sources of F-gas emissions are likely subject to the containment and recovery provisions of the F-gas Regulation, several sectors are still projected to contribute significantly to future F-gas emissions (e.g., room air conditioning, commercial refrigeration, and industrial refrigeration). Potential options to implement additional measures that were considered include non-regulatory approaches (e.g., environmental agreements and self-regulations and enhanced technical standards), further regulatory action (e.g., include additional F-gases, ban use of open F-gas applications on the market, require HFC-23 by-product emissions destruction), or market-based approaches (e.g., tax systems and deposit and refund systems). With these additional measures implemented, the study found that the EU would experience significant reduction in HFC emissions by 2050 (approximately 80 percent, including reductions from the EU F-gas policy framework).

#### Source:

- Schwarz et al. 2011. *Preparatory study for a review of Regulation (EC) No. 842/2006 on certain f-GHGs*. Final Report prepared for the European Commission. Available online at: [http://ec.europa.eu/clima/policies/f-gas/docs/2011\\_study\\_en.pdf](http://ec.europa.eu/clima/policies/f-gas/docs/2011_study_en.pdf). Accessed April 2013.

## UNEP Synthesis Report: HFCs: A Critical Link in Protecting Climate and the Ozone Layer

This synthesis report was prepared in 2011 by UNEP and focuses on HFCs as an ODS substitute and the opportunities for action on reducing the potential climate impact of HFCs. This report states that the current contribution to climate forcing by HFCs is less than one percent; however, HFCs are rapidly increasing in the atmosphere as they are adopted as ozone-friendly alternatives. UNEP reports that emissions of HFCs are growing at a rate of eight percent per year, and by 2050, without action, they could rise so high that they almost cancel the tremendous climate benefits won earlier by the phase-out of CFCs and other ozone-depleting substances. This may challenge international efforts to keep a global temperature rise under 2°C or less this century—the target agreed at the UN climate convention meeting in 2009 and reaffirmed in Cancun in 2010.

This report offers a number of alternatives that can assist in bringing down the projected growth in HFCs: not-in-kind alternatives such as fiber insulation materials, dry-powder asthma inhalers, and buildings designed to avoid the need for air conditioning; alternative substances such as hydrocarbons, CO<sub>2</sub>, diethyl ether, and ammonia; and low-GWP HFCs with shorter lifetimes such as HFC-1234ze and HFC-1234yf. This scientific report underlines that HFCs need to be a clearer part of that landscape and brought more decisively into the suite of options for action that can assist in meeting and keeping the 2°C target.

### Source:

- UNEP. 2011. “HFCs: A Critical Link in Protecting Climate and the Ozone Layer. United Nations Environment Programme. Available at: [http://www.unep.org/dewa/Portals/67/pdf/HFC\\_report.pdf](http://www.unep.org/dewa/Portals/67/pdf/HFC_report.pdf). Accessed April 2013.

## Greenpeace: Cool Technologies: Working without HFCs

This 2012 publication from Greenpeace provides a sampling of companies and enterprises that are using climate friendly technologies in their operations. Although not comprehensive, the report provides a large array of non-HFC initiatives that are currently in place around the globe. Climate friendly technologies exist in nearly the full spectrum of applications, including: domestic refrigeration and air-conditioning; commercial refrigeration and air-conditioning; mobile air-conditioning; industrial process refrigeration; and foam blowing.

### Source:

- Mate, J., C. Papathanasopoulos, and S. Latif. 2012. “Cool Technologies: Working without HFCs. 2012 Edition.” Greenpeace. Available at: <http://www.greenpeace.org/international/Global/international/publications/climate/2012/Fgases/Cool-Technologies-2012.pdf>. Accessed May 2013.

## Other Country Measures

### Bosnia and Herzegovina

There are a number of ongoing tasks related to HFCs in Bosnia and Herzegovina. The established national expert group is preparing a draft of a new Ozone Legislation on the implementation of the HCFC Phase-out Management Plan that will be in force in 2014. This will likely include transitioning to low-GWP alternatives. There are also preparations to establish an import and export licensing system in Bosnia and Herzegovina for HFCs and their blends. Another ongoing task is, in cooperation with UNIDO’s Montreal Protocol Branch, to establish a “Code of Good Practice in the Refrigeration Sector” at the State level.

### Source:

- The information above was review or provided by the government.

### China

**Emission Trading Pilot Programs.** China has pledged to cut its emissions by 17 percent per unit of economic output by 2015, compared to 2010 levels. To help meet their emission reduction targets, seven pilot trading programs have been approved in five cities and two provinces and are scheduled to commence trading as early as June 2013. The pilot trading programs will represent the second largest trading program in the world and are estimated to cover approximately 700 million metric tons CO<sub>2</sub>-eq. by 2014—more than the emission trading programs of South Korea, Australia, and California (Climatewire 2013). Although details of some pilot schemes have yet to be finalized, the rules and design will differ to better inform the Chinese national program that is expected to launch in 2015

(ClimateBridge 2013). Initially, only carbon dioxide will be covered in China's cap-and-trade systems; however, the scope may broaden to cover HFCs and other types of greenhouse gases (Climatewire 2013). Additionally, offset credits earned for HFC-23 destruction projects are no longer eligible in both the EU and Australian programs; China may allow these types of offsets in domestic markets (Point Carbon 2013).

**Clean Development Mechanism (CDM) Project Levy.** On August 26, 2005, at the eighth session of the National Coordination Committee on Climate Change (NCCCC), a proposal was passed by the Chinese government to impose a 65 percent tax on HFC-23 CDM projects. Proposed uses for the revenue from CDM projects include funding CDM administration and approval activities, climate change-related capacity-building activities, and other sustainable development activities identified by the Chinese government (Ministry of the Environment, Japan 2005; Zhu 2013).

**Sources:**

- ClimateWire. 2013. "China nears launch of large emissions trading pilot programs." E&E Publishing, LLC. Available at: <http://www.eenews.net/public/climatewire/2013/05/02/2> Accessed May 2013.
- ClimateBridge. 2012. "Carbon Markets and Climate Policy in China: China's pursuit of a clean energy future." Prepared for The Climate Institute. Available at: [http://www.climateinstitute.org.au/verve/\\_resources/ClimateBridge\\_CarbonMarketsandClimatePolicyinChina\\_October2012.pdf](http://www.climateinstitute.org.au/verve/_resources/ClimateBridge_CarbonMarketsandClimatePolicyinChina_October2012.pdf). Accessed April 2012.
- Point Carbon. 2013. China to allow HFC 23 offsets in domestic CO<sub>2</sub> markets. Available at: <http://www.pointcarbon.com/news/1.2214345>. Accessed April 2012.
- Ministry of the Environment. "CDM Country Guide for China." Edited by Institute for Global Environmental Strategies Chinese Renewable Energy Industries Association: 1st Edition. Copyright 2005 by Ministry of the Environment, Japan. Available at: <http://english.cbcsd.org.cn/dynamic/bringup/download/CDMcountryguideforchina.pdf>. Accessed April 2013.
- Zhu, J. 2013. "Assessing China's discriminative tax on Clean Development Mechanism projects. Does China's tax have so many functions?" Journal of Environmental Planning and Management, 2013.

## Colombia

**Support for Controlling HFC Emissions.** In October 2012, the Colombian government hosted a UNEP conference "Near-Term Climate Protection and Clean Air for Latin America and the Caribbean" to address SLCPs at the regional level. The purpose of the meeting was to: (1) contribute to the development of the regional action plan on air pollution commissioned by the Regional Forum of Latin American Environment Ministers, and (2) to enable engagement with the Climate and Clean Air Coalition to Reduce Short-Lived Climate Pollutants (UNEP 2012).

**Technical Support to End Users.** The Ministry of the Environment and Sustainable Development, through the National Ozone Unit, is the entity in charge of conducting technical support activities for end users of refrigeration substances, promoting mainly climate-friendly refrigerants in all sectors. Technical support consists of meetings, advice on technology replacements, assessing alternatives with zero ODP, and prioritizing low-GWP options. For this purpose, special credit lines and tax benefits are under design for environmentally friendly ODS substitutions and energy efficient consumption.

**Sources:**

- UNEP. 2012. Colombian Government, U.N. Environment Program Host Conference to Tackle Climate Change and Air Pollution. Available at: <http://www.unep.org/environmentalgovernance/News/PressRelease/tabid/427/language/en-US/Default.aspx?DocumentID=2698&ArticleID=9313&Lang=en>. Accessed May 2013.
- The information above was review or provided by the government.

## Croatia, Serbia, and Turkey

Croatia, Serbia, and Turkey are reported to have implemented measures to regulate the import and use of HFCs. There is limited information available on the specific policies that underlie this initiative.

**Source:**

- UNEP DTIE OzonAction Programme. 2010. Thematic Meeting for Candidate Countries on Harmonization of ODS Legislation With EU Regulations: Observations and Recommendations. Novi Sad, Serbia, 21-23 September, 2010.

## India

**Avoidance of HFC Emissions in Rigid Polyurethane Foam (PUF).** India is a host country for three ongoing projects approved to receive certified emission reduction (CER) credits under the Clean Development Mechanism (CDM) with the aim of HFC emissions avoidance in PU foam manufacturing: “Avoidance of GHG emissions in rigid PUF manufacturing by Lloyd Insulations Limited”, “Avoidance in HFC-134a emissions in PUF manufacturing by Acme TelePower Limited”, and “Avoidance of HFC-134a emissions in PUF” (see Table 7). In these projects, a non-GHG blowing agent (e.g., pentane) is used to replace HFC blowing agents in manufacturing facilities producing PU foam.

**Table 7. CDM Projects in India for HFC Emissions Avoidance in Rigid PUF**

Project/ Company Name	Crediting Period	Total MMTCO <sub>2</sub> e	Average Annual MMTCO <sub>2</sub> e
Lloyd Insulations Limited (LIL)	2009-2019	0.21	0.021
Acme TelePower Limited (ATPL)	2009-2019	0.24	0.024
Rinac India Limited	2011-2021	0.15	0.015
<b>TOTAL</b>		0.61	0.061

### Sources:

- United Nations Framework Convention on Climate Change, 2013. Project 2795: Avoidance of GHG Emissions in rigid Poly Urethane Foam (PUF) Manufacturing by LIL. Available at: <http://cdm.unfccc.int/Projects/DB/TUEV-SUED1248705982.41/view>
- United Nations Framework Convention on Climate Change, 2013. Project 2795: Avoidance of GHG Emissions in rigid Poly Urethane Foam (PUF) Manufacturing by Acme TelePower Limited (ATPL). Available at: <http://cdm.unfccc.int/Projects/DB/RWTUV1248688032.27/view>
- United Nations Framework Convention on Climate Change, 2013. Project 2795: Avoidance of GHG Emissions in rigid Poly Urethane Foam (PUF). Available at: <http://cdm.unfccc.int/Projects/DB/SGS-UKL1288881261.68/view>

## Maldives

**Support for Non-HFC Alternatives.** The Maldivian Ministry of Environment and Energy is making efforts to promote non-HFC based equipment. This effort is supported by UNEP and other bi-lateral and multilateral agencies (Maldivian Ministry of Environment and Energy 2013a). At the 24<sup>th</sup> Meeting of the Parties to the Montreal Protocol, the Environment Minister urged Parties to find non-HFC alternatives to HCFCs, remarking that the protection of the ozone layer should not contribute “to the degradation of the global climate systems” (Maldivian Ministry of Environment and Energy 2013b).

### Sources:

- Maldivian Ministry of Environment and Energy. 2013a. Important Ban on HCFC Based Equipment to Commence from June 2014. Available at: <http://www.environment.gov.mv/v1/news/import-ban-on-hydrochloroflourocarbons-hcfc-based-equipment-to-commence-from-june-2014/>. Accessed April 2013.
- Maldivian Ministry of Environment and Energy. 2013b. Environment Minister Dr. Shakeela Calls Parties to the Montreal Protocol Not to Give a Blind Eye to the Inherent Link Between Ozone Protection and Climate Change. Available at: <http://www.environment.gov.mv/v1/news/environment-minister-dr-shakeela-calls-parties-to-the-montreal-protocol-not-to-give-a-blind-eye-to-the-inherent-link-between-ozone-protection-and-climate-change/>. Accessed April 2013.

## Mexico

Over the past five years, Mexico has been building capacity for and implementing large-scale, sector-specific National Appropriated Mitigation Actions (NAMAs). The concept of NAMAs was introduced at COP13 in the Bali Action Plan as: “nationally appropriate mitigation actions by developing country Parties in the context of sustainable development, supported and enabled by technology, financing and capacity-building, in a measurable, reportable and verifiable manner.” SEMARNAT (Secretaría de Medio Ambiente y Recursos Naturales) will lead the coordination and implementation of the Domestic Refrigerator NAMA that will focus on introducing new energy efficient technology that uses refrigerants with lower or zero GWP. The NAMA will also control HFC emissions by recovering and destroying refrigerants during the decommissioning of old refrigerators. Within a five-year timeframe,

the NAMA aims to phaseout HFC-based technology and replace 100 percent of Mexico's domestic market with low GWP energy efficient technology (i.e., 2.4 million units). It is estimated that, throughout its lifetime, this NAMA could mitigate approximately 2 million metric tons of carbon dioxide equivalent (MMTCO<sub>2</sub> eq.)—63 percent of which could be attributed to replacing the refrigerant, HFC-134a. The NAMA is still in the preliminary planning stages; activities are expected to commence from 2014 to 2028.

#### Sources:

- Market Readiness Proposal for Mexico – Domestic Refrigerators NAMA. 2013. Partnership for Market Readiness. Available at: [http://www.thepmr.org/system/files/documents/Mexico\\_MRP\\_Final\\_Refg\\_19-02-2013.pdf](http://www.thepmr.org/system/files/documents/Mexico_MRP_Final_Refg_19-02-2013.pdf). Accessed June 2013.
- NAMA database. 2013. Domestic Refrigerators NAMA. Available at: [http://www.nama-database.org/index.php/Domestic\\_Refrigerators\\_NAMA](http://www.nama-database.org/index.php/Domestic_Refrigerators_NAMA). Accessed July 2013.

### United States

On June 25, 2013, President Obama announced the Climate Action Plan (CAP) to reduce GHG emissions. The CAP calls for some of these GHG reductions to be achieved by curbing emissions of HFCs. To this end, President Obama has made phasing down HFCs a national priority by directing the United States to lead in reductions through international diplomacy as well as domestic actions. Specifically, the President has directed his Administration to transition to equipment that uses safer and more sustainable alternatives. He also directed 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 while prohibiting certain uses of the most harmful chemical alternatives.”

#### Sources:

- The White House, Executive Office of the President. 2013. “The President’s Climate Action Plan.” Available at: <http://www.whitehouse.gov/sites/default/files/image/president27sclimateactionplan.pdf>. Accessed January 2014.

### Thailand

The Thailand Greenhouse Gas Management Organization, with support from GIZ PROKLIMA, has successfully completed a baseline study on the inventory of HFCs in Thailand. The completion of the study marks the first time that such a comprehensive database was established for the Thai refrigeration and air conditioning sector. Currently, the Thai-German initiative is working to develop a NAMA focusing on the refrigeration, air conditioning, and foam blowing sectors. In order to implement a plan to reduce HFC emissions, Thailand has completed the first step of developing an inventory and baseline emissions and must now focus on identifying subsectors that are the best candidates for mitigation action. Thailand will then need to identify potential actions, determine financial and political viability, and then develop a NAMA Description Document.

#### Sources:

- Development of Baseline and Mitigation Strategy for the Thai Refrigeration and Air-Conditioning Sector. 2012. German International Cooperation Based in Bangkok. Available at: [http://www.thai-german-cooperation.info/download/2\\_project\\_thnama.pdf](http://www.thai-german-cooperation.info/download/2_project_thnama.pdf). Accessed June 2013.
- Establishing an Inventory of Consumption and Emission of F-gases in Thailand. 2012. German International Cooperation Based in Bangkok. Available at: [http://www.thai-german-cooperation.info/download/4\\_fgas\\_thailand.pdf](http://www.thai-german-cooperation.info/download/4_fgas_thailand.pdf). Accessed June 2013.
- German International Cooperation. 2012. Elaboration of NAMAs for the industrial sectors refrigeration and foam production. Available at: <http://thai-german-cooperation.info/proklima.html>. Accessed July 2013.

### Smaller-Scale Initiatives

#### Ammonia and Hydrocarbon Chillers in Denmark

Ammonia chillers have been produced in Denmark for the past 30 years. One manufacturer, Johnson Controls, estimates that approximately 200 ammonia chillers are produced every year in Denmark with cooling capacities ranging from 300 kW to 6.5 MW. These units are placed all over the world and are used for comfort cooling in hospitals (e.g., Rigshospitalet-Copenhagen University Hospital),

airports (e.g., London Heathrow Airport and Copenhagen Airport), and shopping malls. These ammonia chillers are more energy efficient than HFC chillers and provide higher cooling capacities.

In addition, two Danish manufacturers (Bundgaard Kolateknik and Johnson Controls) have begun producing medium and large chillers (50 to 400 kW) using hydrocarbons (mainly propane). These units are approximately 10 percent more energy efficient than HFC chillers, and are installed in Denmark, Norway, the UK, and Germany. Approximately 150 HC chillers are produced annually.

**Source:**

- Danish Ministry of the Environment. 2012. "Going Natural. The Danish road to natural refrigerants." Available online at: <http://www2.mst.dk/Udgiv/publications/2012/06/978-87-92903-24-2.pdf>. Accessed April 2013.

### **Ammonia Central Chillers in Public Buildings in Mauritius**

In Mauritius, chillers in two government buildings (Court House and Government Centre) were converted from CFCs to ammonia as part of a pilot project to demonstrate the feasibility of ammonia chillers in tropical climates and promote environmentally friendly (non-HFC) technology to other countries in the region. The ammonia chillers are more energy efficient than the existing CFC units, and have significantly lower leak rates. As a result of the success of the pilot project, ammonia chillers are now being considered for AC systems in retail stores in Mauritius and AC systems in other tropical countries.

**Sources:**

- GTZ-Proklima International. 2011. "Converting Air-Conditioning Systems in Public Buildings in Mauritius to Natural Refrigerants." Available online at: <https://www.giz.de/Themen/en/dokumente/giz2011-en-proklima-projectsheet-mauritius.pdf>. Accessed June 2013.
- Mauritius Ministry of Environment. 2009. "National Workshop to accelerate HCFC phase-out." Available online at: <http://www.gov.mu/portal/goc/menv/files/REPORT-HCFC-v2212.pdf>. Accessed May 2013.

### **Testing CO<sub>2</sub> MVAC Systems in Buses in Germany**

In 1996, Konvekta, a German manufacturer of thermo systems for commercial vehicles, presented the first bus with a CO<sub>2</sub> AC unit (Konvekta 2012). Since then, the prototype system has been running successfully in long-term field tests to prove its everyday suitability. Testing has shown that, compared with HFC-134a, CO<sub>2</sub> is competitive in terms of efficiency and capacity (Greenpeace 2012). In 2008, the first CO<sub>2</sub> units were installed in a commercial bus belonging to BVG, Germany's largest local transport company (Konvekta 2012). In the following years, Konvekta installed more than 10 CO<sub>2</sub> units in buses of public transport companies, with plans to install 50 more in buses in the near future (Konvekta 2012).

**Sources:**

- Greenpeace. 2012. "Cool Technologies: Working without HFCs – Examples of HFC-Free Cooling Technologies in Various Industrial Sectors." Prepared by Janos Mate, Greenpeace International. Interim 2012 Report.
- Konvekta. 2013. "Chronology." Available online at: <http://www.konvekta.de/en/forschung/kaeltemittel-co2/chronologie.html>. Accessed June 2013.

### **Use of Methylal and Methyl Formate in Brazil**

The UNDP commenced pilot projects on the use of methyl formate and methylal for PU foam in Brazil in 2009 and 2010, respectively. The methyl formate pilot project focused on Purcom Quimica Ltda. ("Purcom") and the methylal pilot project was designed around Arinos Quimica Ltda ("Arinos"), both large system houses that produce a range of PU foams, including PU spray. The projects assessed the feasibility of replacing HCFC-141b based on health, safety and environmental considerations, processability, system composition, physical properties, and indicative conversion costs. The project with Purcom found that the mechanical properties of methyl formate-based spray foams outperformed HFC-134a-based systems, and were equivalent to commercial HCFC-141b systems or better but that the thermal efficiency needed further optimization. The results of the methylal pilot project indicated that methylal is a feasible substitute for HCFC-141b for a wide variety of PU foam products. In 2008, Arinos reported using 180 tons of HCFC-141b and 60 tons of methylene chloride. The company intends to pursue the use of methylal as a sole or auxiliary blowing agent in the future; based on **rough calculations, this could result in annual reductions of up to 131,000 million metric tons CO<sub>2</sub>-eq.**

(estimate assumes that Arinos uses methylal as the sole blowing agent to replace 180 tons of HCFC-141b (with a GWP of 725) and 60 tons of methylene chloride (with a GWP of 8.7)).

**Source:**

- United Nations Development Programme (UNDP). 2012. "Methylal as Blowing Agent in the Manufacture of Polyurethane Foam Systems." March 2012. Available at: [www.multilateralfund.org/66/English/1/6617p5.pdf](http://www.multilateralfund.org/66/English/1/6617p5.pdf). Accessed June 2013.

### **Cyclopentane in Appliance Foam in China**

In China, a facility with four production lines of refrigerators and freezers transitioned from use of HCFC-141b and HCFC-142b based **appliance** foam to cyclopentane. Long-term technologies with non-fluorocarbon solutions were preferred for environmental and economic considerations. The project included:

- Converting existing refrigerator cabinet and door foaming plants to use cyclopentane;
- Installing one new cabinet foaming plant with ten stationary foaming fixtures encapsulated with a safety box with exhaust system;
- Developing storage system for cyclopentane;
- Installing chemicals storage and premixing system for polyol and cyclopentane; and
- Installing high pressure foaming machines designed for 134a/cyclopentane.

The systems applied in this project were based on low-cost modular systems available in developing countries.

**Source:**

- United Nations Environment Programme (UNEP). 1999. "Avoiding a Double Phase Out: Alternative Technologies to HCFCs in Refrigeration and Air Conditioning."

### **GE Appliance & Lighting's Transition to Cyclopentane**

GE Appliance & Lighting recently transitioned to in appliance foam. In April 2011, GE's Decatur, AL plant transitioned from HFC-134a to cyclopentane as its foam-blowing agent—becoming the first full-line appliance original equipment manufacturer (OEM) to transition to a low-GWP blowing agent in the U.S. Cyclopentane foam will be used in the production of top-freezer refrigerators in 16, 17, and 18 ft<sup>3</sup> sizes. GE reports that the transition to cyclopentane will reduce the Decatur's GHG emissions from the foam blowing process by 99 percent—equivalent to approximately 400,000 million metric tons CO<sub>2</sub>eq. annually. This reduction will reduce the emissions of the entire facility by more than 80 percent (Appliance Magazine 2011).

**Source:**

- Appliance Magazine. 2011. "GE's Decatur Plant Begins Using Cyclopentane as Blowing Agent." April 2011. Available at: <http://www.appliancemagazine.com/news.php?article=1486014&zone=0&first=1>. Accessed May 2013.
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